1.0 PURPOSE AND INTENT

1.1 To provide a process for prevention, assessment and management of pain, agitation and sedation for newborns.

Note: All recommendations are approximate guidelines only and practitioners must take into account individual patient characteristics and situation. Concerns regarding appropriate treatment must be discussed with the attending neonatologist.

2.0 PRACTICE OUTCOME

2.1 To prevent the potentially damaging effects to the newborn’s brain from both the pain experience and the sequela of medications used to treat pain.

NOTE: See the Micromedex Drug Index for information on specific pharmacologic measures. Access at: http://www.micromedexsolutions.com/home/dispatch See also WRHA Clinical Practice Guideline: Sucrose for Procedural Pain Relief in Infants.

3.0 PAIN ASSESSMENT

3.1 Assess pain using a validated age appropriate pain assessment tool.
   - On admission.
   - Whenever there is a change in medical status.
   - Once a day during hospitalization.

3.2 Use the Neonatal Pain Agitation and Sedation Tool (NPASS) for newborns who are monitored and receiving respiratory support or are post-operative or have significant illness. Use the Neonatal Infant Pain Scale (NIPS) for newborns who are not monitored (See Appendix A).

3.3 Identify and document actual or potential sources of pain/irritability including indwelling tubes or lines, heel-sticks, surgical procedures, suctioning, peritonitis, oitis, other infectious processes, fractures, hunger, interstitial IV’s, and noxious environment.

3.4 Assess pain with each “hands on” vital sign measurement for all infants with actual or potential sources of pain. Frequency of assessment:
   - Invasive tubes or lines: q2-4h.
   - Receiving scheduled or infusion analgesics and/or sedatives: q2-4h.
   - Analgesic/sedative prn: one hour after dose is given, to assess response.
   - Post-op: q2h for 24-48 h then at least q4h until off medication, then resume routine assessments.

3.5 Assess pain before and after all painful procedures, and after pain medications have been administered to evaluate the efficacy of behavioral, environmental and pharmacological agents.

3.6 When pain scores indicate signs of pain or agitation, implement non-pharmacologic measures first if the infant has no identifiable cause for pain.

3.7 Initiate treatment for pain based on pain scores and the source of pain.

3.8 Document pain scores, pain behaviors and responses to any interventions in the patient record.
4.0 PAIN PREVENTION AND NON-PHARMACOLOGICAL PAIN MANAGEMENT

4.1 Reduce the number of painful procedures.
   4.1.1 Group infant’s laboratory tests together.
   4.1.2 Insert appropriate arterial and/or venous lines that reduce the need for repeated intravenous punctures, heel sticks or injections. (The benefits must be weighed against the risks associated with line placement).
   4.1.3 Use non-invasive monitoring techniques whenever clinically appropriate.
   4.1.4 Administer medications via the least painful route possible.
   4.1.5 Minimize all unnecessary handling of infant as touch can be interpreted as pain in some circumstances.

4.2 Anticipate and prevent procedural pain.
   4.2.1 Combine pharmacological and non-pharmacological pain interventions

4.3 Utilize non-pharmacological methods of pain management. These are most effective when used in combination. Review “Neonatal Comfort Checklist” found in Appendix B.
   4.3.2 Breastfeeding (whenever possible) – must be started at least 5 minutes before the procedure.
   4.3.1 Skin-to-skin contact with parent (whenever possible). Initiate 5-10 minutes before the procedure.
   4.3.3 Physiological positioning.
   4.3.4 Swaddling, containment or facilitated tuck.
   4.3.5 Non-nutritive suck (pacifier).
   4.3.6 Decrease environmental stimuli during procedures. Keep light and noise levels low.

4.4 Provide infant with either breast milk (first choice) or oral sucrose before minor invasive procedures unless contraindicated. Allow 2 minutes before the procedure and continue to provide drops during the procedure along with a soother.

4.5 Utilize topical anesthetics to reduce pain associated with venipuncture, lumbar puncture and intravenous catheter insertion when time permits. These are ineffective for heel-stick blood draws. Avoid repeated use. Check with pharmacist for contraindications for use of specific agents in newborns.

4.6 Minimize handling of infant before and after a painful procedure.

4.7 Assess and optimize ventilation to ensure that agitation and discomfort is not a result of inadequate ventilation.

4.8 Do not perform non-emergent care-giving procedures immediately following a painful procedure. Increased excitability of neurons may cause the infant to perceive pain from these activities.

5.0 SEDATION

5.1 Consider sedation whenever ongoing analgesics are necessary to enhance the effects of opioids.
   5.1.1 Use sedatives such as benzodiazepines with caution in preterm infants as they may cause seizure-like myoclonic movements and may cause potential adverse neurological outcomes.
   5.1.2 Do not use sedation in place of analgesics for pain control.
   5.1.3 Avoid long term sedation (weeks or longer) as there is no evidence for the safety of this practice.

5.2 Assess level of sedation based on the infant’s response to stimuli only when “hands-on” vital signs are measured. Do not stimulate the infant unnecessarily to accomplish this.
5.3 Assess sedation as needed even on infants not receiving pharmacological sedation as this may indicate neurologic depression, sepsis or other pathology. In premature infants assess for prolonged untreated pain and/or stress.

5.4 Provide analgesia and sedation to all infants receiving medications for paralysis.
5.4.1 These infants cannot be evaluated behaviorally for pain.
5.4.2 Provide analgesia and sedation via infusion.
5.4.3 Assess doses every day and when paralysis is discontinued.
5.4.4 Consider higher dosing of analgesics if the infant is post-op, has a chest tube or other pathology that would normally cause pain.
5.4.5 Monitor for increases in heart rate and blood pressure which may be the only indicator of a need for more analgesia.
5.4.6 Monitor for tolerance to sedation which may occur without symptoms of inadequate pain relief.

6.0 PAIN MANAGEMENT

6.1 Recognize the contextual circumstances underlying the individual infant’s pain and tailor therapy accordingly. For specific procedures and situations consider the following suggestions:

6.2 Percutaneous or peripheral arterial or venous catheter insertion:
6.2.1 Consider applying topical anesthetic cream.
6.2.2 Give either breast milk (first choice) or oral sucrose.
6.2.3 Consider giving a sedative.

6.3 Arterial/venous cutdown or chest tube insertion:
6.3.1 Subcutaneous infiltration of lidocaine to site (using smallest possible needle gauge available).
6.3.2 Give sedative / analgesic.

6.4 Endotracheal intubation:
6.4.1 Consider sedative if procedure is not emergent. See Neonatal Intubation clinical practice guideline for suggested premedication.

6.5 Intramuscular or subcutaneous injection:
6.5.1 Provide the baby with breastfeeding, or skin to skin, or either oral breastmilk or sucrose (priority in that order) prior to and during the injection.

6.6 Lumbar Puncture:
6.6.1 Give either breast milk (first choice) or oral sucrose and/or sedative.

6.7 Eye exam:
5.7.1 Give either breast milk (first choice) or oral sucrose.
5.7.2 Consider sedative if patient intubated or does not tolerate handling well.

6.8 Nasogastric tube insertion:
6.8.1 Give either breast milk (first choice) or oral sucrose.

6.9 Ongoing analgesia:
6.9.1 Consider intravenous infusion or periodic boluses of analgesic and/or sedative. When using opioids for pain use co-analgesia unless contraindicated.
6.9.2 Doses may need to be increased periodically based on patient and pain scale assessment, as tolerance will occur. Assess daily. To help prevent tolerance, consider alternating between opioids every 5-7 days.
6.9.3 When increasing an infusion dose for pain always give a bolus dose first unless the patient has a specific contraindication. If there is no response to an increased dose, decrease dose and discuss further options.
6.9.4 Promptly treat pain that occurs between regular doses of analgesic (breakthrough pain).
is most effective to use the same opioid as that given in scheduled doses.

6.9.5 When patients’ receiving continuous opioid infusions become intolerant to handling, assess for the possibility of hyperalgesia or allodynia. Treatment options include rapid de-escalation of opioid doses.

6.10 Post-operative: Continue analgesia as long as pain scores continue to indicate requirement.
6.10.1 Consider Opioids the basis for postoperative analgesia after major surgery in the absence of regional anesthesia.
6.10.2 Non-intubated infant: Consider scheduled analgesic for the first 24-48 hrs.
6.10.3 Intubated infant: Consider intravenous infusion or scheduled boluses of opioid analgesic for 24-48 hr.
6.10.4 Consider Acetaminophen after surgery as an adjunct to regional anesthetics or opioids.

7.0 OPIOID WEANING

7.1 Use a weaning process for opioids if:
- there is continued need for analgesia, or
- high doses were used, or
- they were used for a long duration, and especially if
- there was a combination of high dose for long duration (longer than 5-7 days)

7.2 Individualize weaning schedules to each patient as tolerated depending on duration of treatment and medication involved.
7.2.1 Plan for approximately one week wean for every week of opioids
7.2.2 Wean only one drug at a time.
7.2.3 Titrate based on pain scores.

7.3 During weaning consider intermittent bolus of the drug to facilitate wean of the infusion.

7.4 Consider substituting other medications of the same class with a longer half-life.

7.5 Consider adding an adjunct agent for withdrawal symptoms. Suggestions include:
- Clonidine
- Phenobarbital

7.6 Consider other comorbidities when adjusting opioids.

7.7 Assess for signs and symptoms of withdrawal, and if present, monitor them using the Finnegan Score (see Neonatal Abstinence Clinical Practice Guideline). If symptoms occur give one breakthrough dose, go back up to the previous step and leave dose there for 48-72 hours then continue to wean.

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Nicole Sneath, Neonatal Nurse Practitioner, HSC

9.0 REFERENCES


## APPENDIX
Validated Pain Scales for Newborns

### N-PASS: Neonatal Pain, Agitation, & Sedation Scale

<table>
<thead>
<tr>
<th>Assessment Criteria</th>
<th>Sedation</th>
<th>Sedation/Pain</th>
<th>Pain / Agitation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crying Irritability</td>
<td>-2</td>
<td>0/0</td>
<td>1/0</td>
</tr>
<tr>
<td>No cry with painful stimuli</td>
<td>Moans or cries minimally with painful stimuli</td>
<td>No sedation/ No pain signs</td>
<td>Irritable or crying at intervals Consolable</td>
</tr>
<tr>
<td>Behavior State</td>
<td>-1</td>
<td>0/0</td>
<td>1</td>
</tr>
<tr>
<td>No arousal to any stimuli</td>
<td>Arouses minimally to stimuli</td>
<td>No sedation/ No pain signs</td>
<td>Restless, squirming Awakens frequently</td>
</tr>
<tr>
<td>No spontaneous movement</td>
<td>Little spontaneous movement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facial Expression</td>
<td>0/0</td>
<td>0/0</td>
<td>1/0</td>
</tr>
<tr>
<td>Mouth is lax</td>
<td>No expression</td>
<td>Minimal expression with stimuli</td>
<td>Any pain expression intermittent</td>
</tr>
<tr>
<td>No expression</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extremities Tone</td>
<td>-2</td>
<td>0/0</td>
<td>1/0</td>
</tr>
<tr>
<td>No grasp reflex</td>
<td>Weak grasp reflex ↓ muscle tone</td>
<td>No sedation/ No pain signs</td>
<td>Intermittent clenched toes, fists or finger splay Body is not tense</td>
</tr>
<tr>
<td>Floccid tone</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vital Signs</td>
<td>0/0</td>
<td>1/0</td>
<td>2/0</td>
</tr>
<tr>
<td>HR, RR, BP, SaO₂</td>
<td>No variability with stimuli</td>
<td>&lt; 10% variability from baseline with stimulus</td>
<td>No sedation/ No pain signs</td>
</tr>
<tr>
<td>No hyperventilation</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Premature Pain Assessment* → +1 if <30 weeks gestation / corrected age.

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*Loyola University Health System, Loyola University Chicago 2009*

*Rev. 2/10/09* Pat Hummel, MA, APN, NNP, PNP

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This tool is currently undergoing testing for validity and reliability, and the authors cannot accept responsibility for errors or omission or for any consequences resulting from the application or interpretation of this material.
Scoring Criteria

Crying / Irritability
-2 → No response to painful stimuli
  • No cry with needle sticks
  • No reaction to ETT or nares suctioning
  • No response to care giving
-1 → Moans, sighs, or cries (audible or silent) minimally to painful stimuli, e.g. needle sticks, ETT or nares suctioning, care giving
0 → No sedation signs or No pain/agitation signs
+1 → Infant is irritable/crying at intervals - but can be consoled
  • If intubated - intermittent silent cry
+2 → Any of the following:
  • Cry is high-pitched
  • Infant cries inconsolably
  • If intubated - silent continuous cry

Facial Expression
-2 → Any of the following:
  • Mouth is lax
  • Drooling
  • No facial expression at rest or with stimuli
-1 → Minimal facial expression with stimuli
0 → No sedation signs or No pain/agitation signs
+1 → Any pain face expression observed intermittently
+2 → Any pain face expression is continual

Extremities / Tone
-2 → Any of the following:
  • No palmar or planter grasp can be elicited
  • Flaccid tone
-1 → Any of the following:
  • Weak palmar or planter grasp can be elicited
  • Decreased tone
0 → No sedation signs or No pain/agitation signs
+1 → Intermittent (≥30 seconds duration) observation of toes and/or hands as clenched or fingers splayed
  • Body is not tense
+2 → Any of the following:
  • Frequent (≥30 seconds duration) observation of toes and/or hands as clenched, or fingers splayed
  • Body is tense/stiff

Behavior / State
-2 → Does not arouse or react to any stimuli:
  • Eyes continually shut or open
  • No spontaneous movement
-1 → Little spontaneous movement, arouses briefly and/or minimally to any stimuli:
  • Opens eyes briefly
  • Reacts to suctioning
  • Withdraws to pain
0 → No sedation signs or No pain/agitation signs
+1 → Any of the following:
  • Restless, squirming
  • Awakens frequently or easily with minimal or no stimuli
+2 → Any of the following:
  • Kicking
  • Arching
  • Constantly awake
  • No movement or minimal arousal with stimulation (not sedated, inappropriate for gestational age or clinical situation)

Vital Signs: HR, BP, RR, & O₂ Saturations
-2 → Any of the following:
  • No variability in vital signs with stimuli
  • Hypoventilation
  • Apnea
  • Ventilated infant - no spontaneous respiratory effort
-1 → Vital signs show little variability with stimuli - less than 10% from baseline
0 → No sedation signs or No pain/agitation signs
+1 → Any of the following:
  • HR, RR, and/or BP are 10-20% above baseline
  • With care/stimuli infant desaturates minimally to moderately (SaO₂ 76-85%) and recovers quickly (within 2 minutes)
+2 → Any of the following:
  • HR, RR, and/or BP are > 20% above baseline
  • With care/stimuli infant desaturates severely (SaO₂ < 75%) and recovers slowly (>2 minutes)
  • Out of sync/fighting ventilator
# Neonatal Infant Pain Scale (NIPS)

<table>
<thead>
<tr>
<th>NIPS</th>
<th>0 point</th>
<th>1 point</th>
<th>2 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facial expression</td>
<td>Relaxed</td>
<td>Contracted</td>
<td>–</td>
</tr>
<tr>
<td>Cry</td>
<td>Absent</td>
<td>Mumbling</td>
<td>Vigorous</td>
</tr>
<tr>
<td>Breathing</td>
<td>Relaxed</td>
<td>Different than basal</td>
<td>–</td>
</tr>
<tr>
<td>Arms</td>
<td>Relaxed</td>
<td>Flexed/stretched</td>
<td>–</td>
</tr>
<tr>
<td>Legs</td>
<td>Relaxed</td>
<td>Flexed/stretched</td>
<td>–</td>
</tr>
<tr>
<td>Alertness</td>
<td>Sleeping/calm</td>
<td>Uncomfortable</td>
<td>–</td>
</tr>
</tbody>
</table>

Maximal score of seven points, considering pain ≥ 4.
APPENDIX B

NEONATAL COMFORT CHECKLIST

IMPORTANT QUESTIONS IN THE ASSESSMENT OF INFANT COMFORT

**WHAT** — Is this pain or irritability?

**WHY** — Is there a reason that the infant is in pain or agitated?

- N-PASS score documented before using Neonatal Comfort Checklist
- Repeat N-PASS score after using Neonatal Comfort Checklist

**ASSESS:**

**Comfort:**
- Is the infant in a flexed and midline position?
- Is the infant contained appropriately?
- Does the infant’s position need to be changed?
- Can the infant be placed in kangaroo care?

**Ventilation:**
- Is the infant being appropriately ventilated?
- If ventilated, can the infant be weaned or extubated?
- Does the infant need a CXR or a blood gas?

**GI:**
- Is the infant NPO or need to be fed?
- Does the infant need to be changed to cue-based feeds?
- Can feeds be safely increased?
- Is the NG/OG in correct position?
- Are there any signs of feeding intolerance?

**Infusions:**
- Are all IV’s patent and infusing well?

**Medications:**
- Are the current meds appropriate for gestational age and the patient’s weight?
- Has the infant been on an opioid infusion for greater than 7 days?
- Is a co-analgesic appropriate?

**POTENTIAL STRATEGIES TO INCREASE INFANT COMFORT**

<table>
<thead>
<tr>
<th>NON-PHARMACOLOGIC:</th>
<th>PHARMACOLOGIC:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- kangaroo care</td>
<td>- If initiating or increasing an infusion, was a bolus given first?</td>
</tr>
<tr>
<td>- cue-based care</td>
<td>- Should current infusion be changed to a different med? (especially if &gt;7 days due to potential tolerance and build up of metabolites)</td>
</tr>
<tr>
<td>- breastfeeding</td>
<td>- Should current infusion be increased?</td>
</tr>
<tr>
<td>- sucking</td>
<td>- Should current infusion be decreased? (due to build up of metabolites or if increase was ineffective)</td>
</tr>
<tr>
<td>- positioning (use dandle wraps or snuggle ups)</td>
<td>- Should an additional med be given for synergistic effect?</td>
</tr>
<tr>
<td>- sucrose (for painful procedures only)</td>
<td></td>
</tr>
</tbody>
</table>