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Neonatal Pain Assessment and Procedural Pain Management

Version: 4

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Original approval by NICU Interprofessional Practice Nov 26, 2010

1.0 Introduction

Pain management strategies will be focused on managing pain during procedures and managing surgical and subacute pain or disease related pain. In addition to developmental strategies, pharmacological strategies should be used based on the type of procedure.

2.0 Definitions

PIPP-R: Premature Infant Pain Profile is a bio-behavioural observational tool for acute and procedural pain.

FLACC-R: Face, Legs, Activity, Cry, Consolability is a behavioural observational tool for acute pain.

3.0 Clinical Practice Recommendations

The grading system in Table 1 serves as a guideline for the user about the hierarchy of evidence available to support each recommendation.

Table 1. Grades of Recommendation	
A	Recommendation supported by at least one randomized controlled trial, systematic review or meta-analysis.
B	Recommendation supported by at least one cohort comparison, case study or other experimental study.
C	Recommendation supported by expert opinion or experience of a consensus panel.

3.1 Pain Assessment

Pain assessment scores

1. **PIPP-R score:** Premature Infant Pain Profile-Revised is a bio-behavioural observational tool for acute and procedural pain.
   PIPP-R scores to be completed for infants ≤ 48 weeks post menstrual age (i.e., 2 months corrected age).

2. **r-FLACC score:** revised Face, Legs, Activity, Cry, Consolability (*FLACC) score* is a behavioural observational tool for acute pain. r-FLACC scores are to be completed for infants > 48 weeks post menstrual age.

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Example:

- 8-week-old 32-week gestation infant = 40 weeks gestation, therefore complete **PIPP-R** score.
- 8-week-old 41-week gestation infant = 49 weeks gestation, therefore complete **r-FLACC** score. See Pain Assessment ==>

Frequency of pain assessment scores

1. Once per shift, a pain score (PIPP-R or r-FLACC) scores to be assessed and documented on each patient, on admission, and before, during and after an invasive procedure as per hospital policy.
2. Pain scores to be done more frequently for the following infants.
    - To assess pain in infants with known medical conditions or interventions that may cause pain (e.g., NEC, chest tubes).
    - Following post-operative procedures as per See Pain Management Guidelines for Post-Operative Neonates
    - Following changes to continuous analgesia.
    - To evaluate for pharmacological treatments for infants on short term opioids. For patients with treatment lengths greater than 5 days utilize routine Neonatal Abstinence Scoring for withdrawal of opioids as per the Prevention and Treatment of Opioid and Benzodiazepine Withdrawal.

3.2 Pain Management

For general principles of pain management, see Pain Management Guideline ==>

3.2.1 All infants should receive physical/psychological developmentally appropriate strategies during all painful procedures[2] **(Grade B).** Developmental strategies that are considered acceptable for tissue damaging procedures (such as needle pokes) include:

1. Sucrose
2. Skin to skin contact
3. Breastfeeding

Other developmental strategies are considered adjunct strategies. They can be combined with one of the above strategies or with pharmacological strategies to reduce pain during procedures. These strategies include:

4. Non-nutritive sucking
5. Positioning and containment
6. Swaddling
7. Reduction of light and sound levels
8. Minimal handling
9. Auditory and visual distraction

3.2.2 Topical lidocaine and prilocaine analgesia

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Local topical analgesics may be used with some procedures but may be limited if vasoconstriction may inhibit the success of the procedure (e.g., IV insertion). **(Grade C).** Topical Lidocaine and Prilocaine analgesia (e.g., EMLA) (see SickKids e-formulary).[8] can be used in all infants. If infant is <1000 grams or < 14 days old consider using gauze and avoiding use of tegaderm to prevent skin injury during removal.

3.2.3 Sucrose Administration

Refer to SickKids e-Formulary **for dosing of sucrose in neonates.** Doses may be repeated for prolonged procedures.
Document sucrose use and effectiveness using appropriate pain scores.
Order sucrose on a PRN basis to facilitate use for procedures such as bloodwork, IV starts, eye exams, drain removal, echocardiography, nasogastric or orogastric tube insertion.
Sucrose may be ordered by the MD/NP or RN (under Nursing Order Policy).
Refer to SickKids e-Formulary for sucrose contraindications

See Pain Management Guideline ==>

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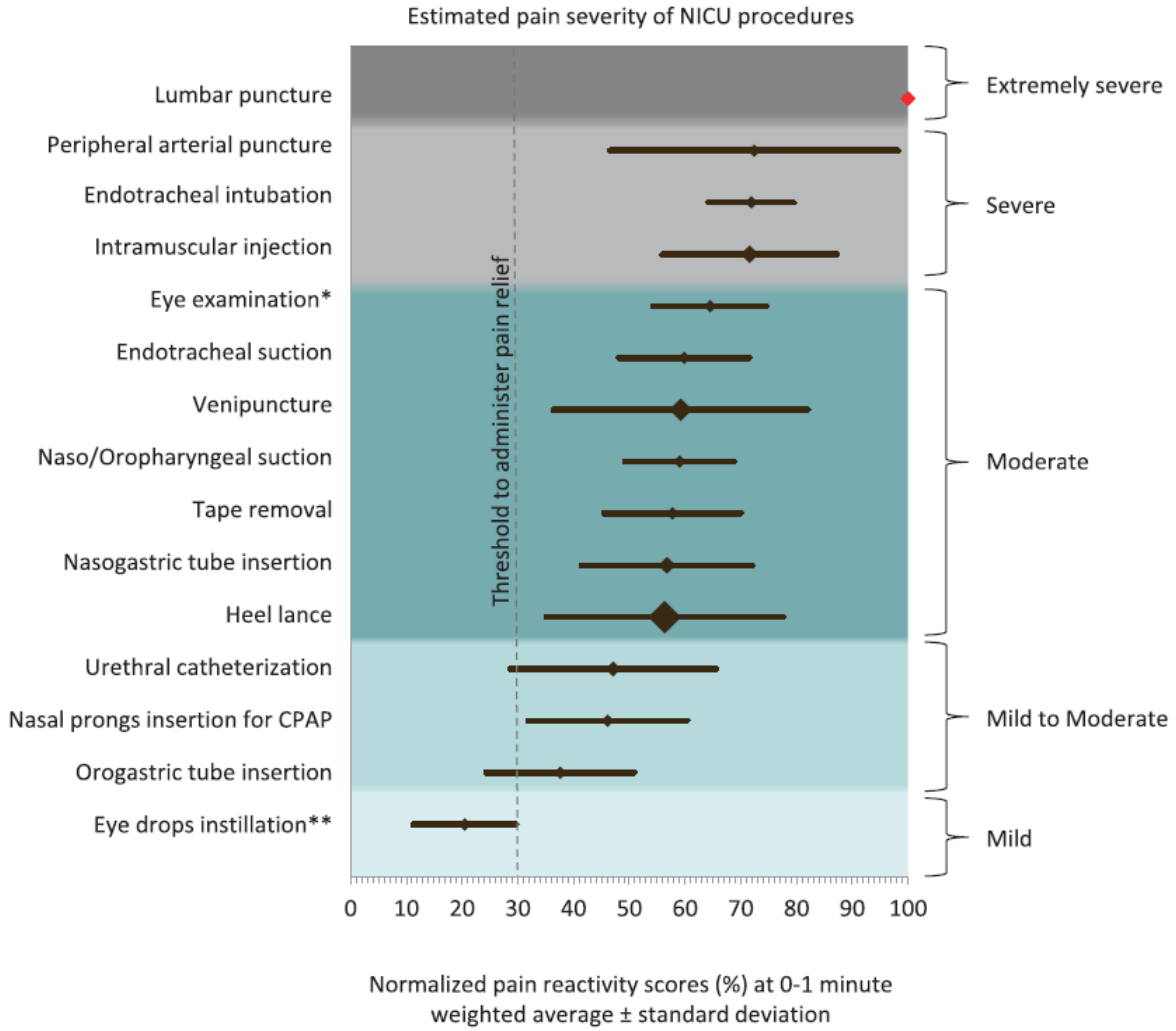
3.3 Adjunct Procedural Pain Management

The following recommended pain management strategies are based on the estimated severity of pain. In addition, use appropriate developmental pain reduction strategies as outlined above.



Laudiano-Dray et al. 2020

3.3.1 Procedural Pain: Recommended options for the management of pain for common neonatal procedures

Procedure	Recommended pain reduction management

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Chest tube insertion	• Fentanyl 1mcg/kg/dose IV 3-5 minutes prior to procedure. • Use pacifier with 24% Sucrose 2 minutes prior to procedure SickKids e-Formulary • Lidocaine 1% SQ as local anesthetic as per SickKids e-Formulary • Start morphine infusion of 5mcg/kg/hr following opioid bolus and assess infant pain scores. • PRN morphine and/or IV or enteral acetaminophen can also be used.
Chest tube removal	• Fentanyl bolus 0.5mcg/kg/dose 3-5 minutes prior to procedure. • Use pacifier with 24% Sucrose 2 minutes prior to procedure as per SickKids e-Formulary (Grade B).
Echocardiogram	Use pacifier with 24% sucrose 2 minutes prior to procedure as per sucrose administration guideline and SickKids e-Formulary (Grade B).
Eye exams (e.g., ROP exam)	Use pacifier with 24% Sucrose 2 minutes prior to procedure SickKids e-Formulary (Grade B) in addition to eye drops prescribed by Ophthalmology.
Eye - intravitreal bevacizumab **(i.e., Avastin).**	• Administer Fentanyl 0.5-1mcg/kg/dose IV 3-5 minutes prior to the procedure. • Consider using midazolam 0.05-0.1mg/kg/dose prn as per SickKids e-Formulary for sedation. Use cautiously in non-intubated infants. • Use pacifier with 24% Sucrose 2 minutes prior to procedure SickKids e-Formulary (Grade B). • Use developmental strategies such a bundling for containment during the procedure.
Heel lance	Use pacifier with 24% Sucrose 2 minutes prior to procedure as per SickKids e-Formulary (Grade B), skin to skin or breastfeeding.
Injection - intramuscular (e.g., immunization)	• Use pacifier with 24% Sucrose 2 minutes prior to procedure as per SickKids e-Formulary (Grade B), skin to skin or breastfeeding. • Apply topical anesthetic cream EMLA (lidocaine and prilocaine) 45 – 60 minutes prior to procedure as per SickKids e-Formulary. • Complete injection as per Intramuscular Injections policy and procedure.
Procedure	**Recommended pain reduction management**
Injection - subcutaneous	• Use pacifier with 24% Sucrose 2 minutes prior to procedure as per SickKids e-Formulary (Grade B), skin to skin or breastfeeding. • Complete injection as per Intramuscular Injections policy and procedure.
Intubation	As per rapid sequence intubation (RSI) guidelines.

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Lumbar puncture	• Apply local topical anesthetic cream- EMLA 45-60 minutes prior to procedure as per SickKids e-Formulary. • Consider fentanyl 1mcg/kg/dose prior to procedure and/or midazolam 0.05-0.1mg/kg/dose for sedation if infant is difficult to position. Use midazolam cautiously in non-intubated infants. For preterms <35 weeks, midazolam is contraindicated • Use pacifier with 24% Sucrose 2 minutes prior to procedure SickKids e-Formulary (Grade B). • Cautious physical handling is advised.
Nasogastric/orogastric tube insertion	Use pacifier with 24% sucrose 2 minutes prior to procedure SickKids e-Formulary (Grade B).
Palliative care	• Physical and psychological strategies for pain management. • Oral, sublingual, or buccal morphine and/or lorazepam may be utilized as recommended by the palliative care team. • Refer to NICU End of life (EOL) guidelines and EOL order set.
PICC insertion	See table below
PICC removal for cuffed IGT lines only	• Cuffed IGT lines must be removed by IGT staff and will be organized by Vascular access service (VAS) staff. • Procedure may be performed in NICU or IGT as determined by VAS and IGT. • Analgesia is as per vascular access service (VAS) and IGT recommendations. • Topical EMLA is often used as per SickKids e-Formulary. • Uncuffed lines may be removed by NICU staff at the discretion of IGT.
Procedure	**Recommended pain reduction management**
Peripheral arterial sampling **Peripheral arterial catheter insertion**	• Apply topical anesthetic cream EMLA 45 – 60 minutes prior to procedure as per SickKids e-Formulary. • If EMLA not used, fentanyl 1mcg/kg/dose IV 3 - 5 minutes prior to procedure. • Ultrasound guided insertion should be used if available. Use of ultrasound may decrease analgesic requirements. • Use pacifier with 24% sucrose 2 minutes prior to the procedure as per SickKids e-Formulary.
Post-operative pain management	Refer to Neonatal Post-Operative Pain Guidelines.

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Umbilical catheter insertion	Use pacifier with 24% sucrose 2 minutes prior to procedure as per SickKids e-Formulary.
• **Urinary catheters insertion** • **Suprapubic bladder tap**	Use pacifier with 24% sucrose 2 minutes prior to procedure as per SickKids e-Formulary.
Venipuncture or intravenous catheter insertion	• Use pacifier with 24% sucrose 2 minutes prior to procedure) as per SickKids e-Formulary. • If desired and non-urgent, consider apply local topical anesthetic cream- EMLA 45-60 minutes prior to procedure as per SickKids e-Formulary.

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<table>
<tr><th>PICC Insertions</th><th colspan="3">Recommended pain reduction management</th></tr>
<tr><td rowspan="2">PICC insertion - NICU</td><td>Preterm infants</td><td><u>Non-intubated</u>
▪ Fentanyl 0.5 mcg/kg/dose IV 3 – 5 minutes prior to procedure.
▪ Use pacifier with 24% sucrose 2 minutes prior to procedure as per SickKids e-Formulary (Grade B).</td><td><u>Intubated</u>
▪ Fentanyl 1 mcg/kg/dose IV 3 – 5 minutes prior to procedure.
▪ Use pacifier with 24% sucrose 2 minutes prior to procedure as per SickKids e-Formulary (Grade B).</td></tr>
<tr><td>Term infants</td><td colspan="2"><u>Intubated or non-intubated</u>
▪ Fentanyl 1 mcg/kg/dose IV 3 – 5 minutes prior to procedure.
▪ Administer fentanyl by slow IV over 3 - 5 minutes OR
▪ Morphine 0.1 mg/kg/dose IV 20 minutes prior to procedure
▪ Consider using midazolam 0.05-0.1mg/kg/dose prn as per SickKids e-Formulary if needed for sedation. Use cautiously in non-intubated infants.
Use pacifier with 24% sucrose 2 minutes prior to procedure as per sucrose administration guideline and SickKids e-Formulary (Grade B).</td></tr>
<tr><td rowspan="2">PICC insertion – IGT

(Image guided therapy)</td><td>Preterm infants</td><td><u>Non-intubated</u>
▪ Fentanyl 0.5 mcg/kg/dose IV 3 – 5 minutes prior to procedure.
▪ Use pacifier with 24% sucrose 2 minutes prior to procedure as per SickKids e-Formulary (Grade B).
▪ Apply topical anesthetic cream EMLA (lidocaine and prilocaine) 45 – 60 minutes prior to procedure as per SickKids e-Formulary.</td><td><u>Intubated</u>
▪ Fentanyl 1 mcg/kg/dose IV 3 – 5 minutes prior to procedure.
▪ Use pacifier with 24% sucrose 2 minutes prior to procedure as per SickKids e-Formulary (Grade B).
▪ Apply topical anesthetic cream EMLA (lidocaine and prilocaine) 45 – 60 minutes prior to procedure as per SickKids e-Formulary.</td></tr>
<tr><td>Term infants</td><td colspan="2"><u>Intubated or non-intubated</u>
▪ Fentanyl 1 mcg/kg/dose IV 3 – 5 minutes prior to procedure OR
▪ Morphine 0.1 mg/kg/dose IV 20 minutes prior to procedure.
▪ Midazolam 0.05 mg/kg/dose 5 minutes prior to procedure if needed for additional sedation.
▪ May repeat midazolam 0.05 mcg/kg/dose x 1, 30 minutes after first dose if inadequate sedation.
▪ Use pacifier with 24% sucrose 2 minutes prior to procedure as per SickKids e-Formulary (Grade B).
▪ Apply topical anesthetic cream EMLA 45 – 60 minutes prior to procedure as per SickKids e-Formulary.</td></tr>
</table>

4.0 Related Documents

Pain Assessment Policy ==>

Pain Management Guideline ==>

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Neonatal Post-Operative Pain Guidelines

Removal of a Peripherally Inserted Central Catheter (PICC) ==>

E-formulary: EMLA

E-formulary: Sucrose

5.0 References

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