NICU Pain Management Clinical Guideline

Inclusion Criteria: Any postoperative patient in the NICU

Recommendations Based on History of Anticipated Degree of Pain Associated with Surgery *and* History of Previous Opioid Exposure(s)

Potential for Mild Pain Procedures

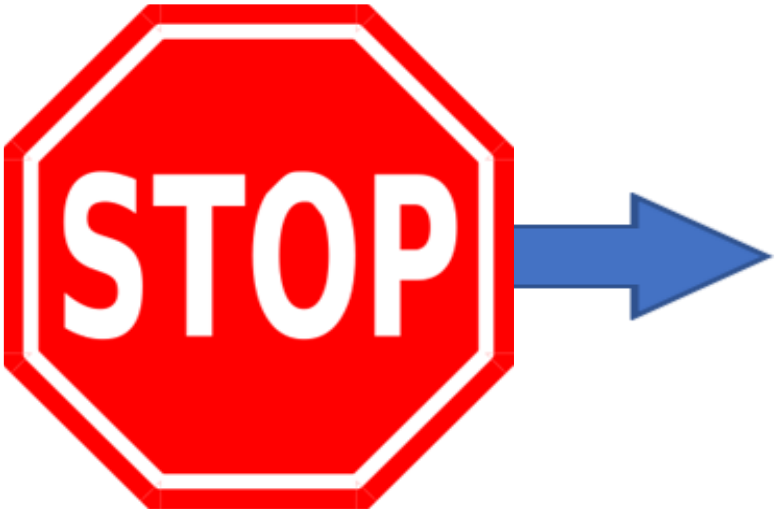
- PEG
- Laparoscopic procedures (g-tube, Ladd's, hernia repair)

Potential for Moderate Pain Procedures

- PDA Ligation
- Chest tube insertion and chest tube maintenance
- Gastrostomy tube with or without Nissen
- Abdominal drain insertion
- Gastroschisis silo placement
- Incarcerated hernia repair
- Anorectal malformation repair
- Hirschsprung's Disease Pull through
- VP shunt placement
- Myelomeningocele closure

Potential for Severe Pain Procedures

- Closure or reduction of abdominal wall defects
- CDH Repair
- TEF Repair
- Thoracotomy
- Exploratory laparotomy
- Critical airway procedure and/or tracheostomy
- Open/ siloed abdomen
- Mandibular distraction



Discussion of airway security and effects of narcotics on respiratory depression necessary in preoperative huddle and with ongoing pain management decisions

Previous opioid exposure defined as greater than 7 days of opioid exposure within 1 month of present surgery

Approved - Evidence Based Medicine Committee
9/20/2023

Reassess the appropriateness of Care Guidelines as condition changes and 24 hrs after admission. This guideline is a tool to aid clinical decision making. It is not a standard of care. The physician should deviate from the guideline when clinical judgment so indicates.

NICU Pain Management Clinical Guideline

Guideline #1: Potential for MILD/MODERATE Post-Operative Pain

(see attached for listing of mild/moderate painful procedures)

Extubated or Intubated

Scheduled Acetaminophen IV 10 mg/kg/dose Q6 hours for 48 - 72 hours postoperative

and

Intermittent Morphine 0.05 mg/kg/dose IV PRN every 2 hours for breakthrough pain

*if experiencing pain with NPASS scores ≥ 4 upon *postoperative admission* to the NICU consider 1x dose of Fentanyl 1 mcg/kg/dose IV every 10 min PRN x 1 - 2 doses *administered slowly*

NPASS Score -2 to -10
Heavy Sedation

- Consider reason for scores: planned sedation or was patient not reversed
- If unplanned sedation→ wean infusion rate or transition to PRN doses
- Continue NPASS scoring per protocol
- Continue non-pharmacological interventions

NPASS Score -1 to +3
Goal

- Adequate control of pain and sedation; no change recommended
- Continue NPASS scoring per protocol
- Continue non-pharmacological interventions

NPASS Score ≥ 4
Danger Zone

- Utilize PRN Morphine IV dose
- Continue NPASS scoring per protocol
- Continue non-pharmacological interventions

≤ 3 PRN Doses in 12 hours

- Utilize PRN Morphine IV dose as needed
- Continue NPASS scoring per protocol
- Continue non-pharmacological interventions

≥ 3 PRN Doses in 12 hours

Extubated or Intubated

Administer prn dose and start low dose morphine continuous infusion

Opioid Naive

- Utilize low dose Morphine infusion of 0.02 mg/kg/hr
- Closely monitor patient respiratory status if extubated

Opioid Exposed

- Utilize low dose Morphine infusion of 0.05 mg/kg/hr
  - If on continuous infusion prior to procedure then restart infusion and increase dose by 20%
- Reassess NPASS and titrate up (scores remaining ≥ 4) by 0.01 mg/kg/hr every 6 - 12 hours

NICU Pain Management Clinical Guideline

Guideline #2: Potential for SEVERE Post-Operative Pain

(see attached for listing of mild/moderate painful procedures)

Extubated or Intubated - engage in preoperative discussion of sedation needs and potential plan to keep patient intubated

Scheduled Acetaminophen IV 10 mg/kg/dose Q 6 hours for 48 - 72 hours postoperative
and
Start low dose continuous morphine infusion

*if experiencing pain with NPASS scores ≥ 4 upon *postoperative admission* to the NICU consider 1x dose of Fentanyl 1 - 2 mcg/kg/dose IV every 10 min PRN x 1 - 2 doses *administered slowly*

**consider potential need for sedation (see below recommendations)

Opioid Naive	***Opioid Exposed***
• Utilize low dose Morphine infusion of 0.03 - 0.05 mg/kg/hr • Closely monitor patient respiratory status if extubated	• Utilize low dose Morphine infusion of 0.05 - 0.1 mg/kg/hr *or* increase current opioid infusion by 20% • Reassess NPASS and titrate up (scores remaining ≥ 4) by 0.01 mg/kg/hr every 6 - 12 hours • Closely monitor patient respiratory status if extubated

Intermittent Morphine 0.05 mg/kg/dose IV PRN every 2 hours for breakthrough pain to start
- if increasing morphine infusion, the PRN dose and infusion hourly dose should be the same

NPASS Score -2 to -10 ***Heavy Sedation***

- Consider reason for scores: planned sedation or was patient not reversed
- If unplanned sedation→ wean infusion rate or transition to PRN doses
- Continue NPASS scoring per protocol
- Continue non-pharmacological interventions

NPASS Score -1 to +3 ***Goal***

- Adequate control of pain and sedation; no change recommended
- Continue NPASS scoring per protocol
- Continue non-pharmacological interventions

NPASS Score ≥ 4 ***Danger Zone***

≤ 3 PRN Doses in 12 hours

- Utilize PRN Morphine IV dose as needed
- Continue NPASS scoring per protocol
- Continue non-pharmacological interventions

≥ 3 PRN Doses in 12 hours

Extubated or Intubated

Administer prn dose and increase morphine continuous infusion

Opioid Naive	***Opioid Exposed***
• Increase Morphine infusion by 20% • **Closely monitor patient respiratory status if extubated**	• Increase Morphine infusion by 20% • Consider Pain Team consult • **Closely monitor patient respiratory status if extubated**

****Sedation Recommendations:**
- If morphine infusion requires > 2 rate/dose increases and ≥ 4 PRN doses are given within a 12 hour period after infusion started, consider the addition of *dexmedetomidine 0.2 - 1 mcg/kg/hr.*
- If experiencing continued agitation, consider addition of midazolam or Ativan

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Guideline #3: For older infants > 4months age undergoing lung mass resection (e.g. CPAM removal)

Extubated or Intubated

Scheduled Ketorolac (Toradol) 0.5 mg/kg per dose IV every 6 - 8 hours for maximum of 48 hours

Acetaminophen IV 10 mg/kg/dose Q6 hours PRN for 48 - 72 hours postoperative

and

Intermittent Morphine 0.03 - 0.05 mg/kg/dose IV PRN every 2 hours for breakthrough pain

(see attached listing of mild/moderate painful procedures)

NPASS Score -2 to -10
Heavy Sedation

- Consider reason for scores: planned sedation or was patient not reversed
- If unplanned sedation→ may be secondary to anesthesia, do not give morphine.
- Continue NPASS scoring per protocol
- Continue non-pharmacological interventions

NPASS Score -1 to +3
Goal

- Adequate control of pain and sedation; no change recommended
- Continue NPASS scoring per protocol
- Continue non-pharmacological interventions

NPASS Score ≥ 4
Danger Zone

- Utilize PRN Morphine IV dose
- Continue NPASS scoring per protocol
- Continue non-pharmacological interventions

≤ 3 PRN Doses in 12 hours

- Utilize PRN Morphine IV dose as needed
- Continue NPASS scoring per protocol
- Continue non-pharmacological interventions

≥ 3 PRN Doses in 12 hours

Alternate Ketorolac with Acetaminophen every 3 hours
(Ketorolac Q6 hours and IV Acetaminophen Q6 hours)
If intubated, may consider Morphine drip 0.03 – 0.05 mg/kg/hour for uncontrolled pain

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Guideline #4: for infants undergoing Tracheostomy or Mandibular Distraction Osteogenesis (MDO) procedure.

(see attached for mild/moderate painful procedures)

Scheduled Acetaminophen IV 10 mg/kg/dose Q 6 hours for 48 - 72 hours postoperative
and
Start low dose continuous Morphine infusion 0.05 mg/kg/hr, may increase to 0.1 mg/kg/hr if pain not controlled
and
Start Dexmedetomidine (Precedex) at 0.2 mcg/kg/hr, may titrate up to 1 mcg/kg/hr if continues to be agitated

Consider adding Midazolam (Versed) or Lorazepam (Ativan) if agitation persists

Consider paralysis with Vecuronium if cannot control agitation

*if experiencing pain with NPASS scores ≥4 upon *postoperative admission* to the NICU consider 1x dose of Fentanyl 1 - 2 mcg/kg/dose IV every 10 min PRN x 1 - 2 doses *administered slowly*

**consider potential need for sedation (see below recommendations)

Intermittent Morphine 0.05 mg/kg/dose IV PRN every 2 hours for breakthrough pain

NPASS Score -2 to -10 ***Heavy Sedation***	NPASS Score -1 to +3 ***Goal***	NPASS Score ≥ 4 ***Danger Zone***
• Consider reason for scores: planned sedation or was patient not reversed • If unplanned sedation→ wean infusion rate or transition to PRN doses • Continue NPASS scoring per protocol • Continue non-pharmacological interventions	• Adequate control of pain and sedation; no change recommended • Continue NPASS scoring per protocol • Continue non-pharmacological interventions	≤ 3 PRN Doses in 12 hours ≥ 3 PRN Doses in 12 hours

- Utilize PRN Morphine IV dose as needed
- Continue NPASS scoring per protocol
- Continue non-pharmacological interventions

Opioid Naive	***Opioid Exposed***
• Increase Morphine infusion by 20% • **Closely monitor patient respiratory status if extubated**	• Increase Morphine infusion by 20% • Consider Pain Team consult • **Closely monitor patient respiratory status if extubated**

NICU Pain Management Clinical Guideline
References

Aukes, D. I, Roofhooft, D. W. E., Simons, S. H. P, Tibboel, D., & van Dijk, M. (2015). Pain Management in Neonatal Intensive Care: Evaluation of the Compliance with Guidelines. *The Clinical Journal of Pain, 31*(9), 830-835. https://doi.org/10.1097/AJP0000000000000168 (Level I)

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Walter-Nicolet, E., Calvel, L., Gazzo, G., Poisbeau, P., & Kuhn, P. (2017). Neonatal Pain, Still Searching for the Optimal Approach. *Current Pharmaceutical Design, 23*(38), 5861-5878. https://doi.org/10.2174/1381612823666171017164957 (Level II)