

Guideline

Pain Assessment and non-pharmacological management of the Neonate during transfer

1 Scope

For use within the Paediatric and Neonatal Decision Support and Retrieval (PaNDR) for the East of England
To be used in conjunction with the East of England Operation Delivery Network: Pain management Guideline 2021 – 2024

2 Purpose

- To provide guidance in the assessment of pain of the Neonate.
- To minimise the intensity, duration and physiological impact of pain.
- To maximise the comfort of the neonate during transfer.
- To maximise the infants ability to cope with and recover from painful experiences.

Key Recommendations

- Staff understand the pain assessment tool NPASS used in the transport setting. (See Appendix 1)
- All infants should be appropriately assessed at appropriate times.
- Pain scores will be accurately documented using the relevant pain score.
- Staff should be aware of the environment in which the infant is nursed and its effect on the infant's coping mechanisms.
- Staff should be aware of the non-pharmacological interventions used for pain management.
- Staff should be aware of the potential side effects of any pharmacological interventions used in neonates.
- This guideline should be used in conjunction with the PaNDR developmental care guideline.

3 Definitions and abbreviations

NPASS – Neonatal Pain, Agitation and Sedation Score.
UVC- Umbilical venous catheter
UAC- Umbilical arterial catheter

4 Introduction

Pain is defined as 'an unpleasant sensory and emotional experience associated with actual or potential tissue damage' (1). Effective pain management is the optimal standard of care for preterm and term infants. Expediting appropriate non-pharmacological and pharmacological actions can potentially improve clinical and neurodevelopmental outcomes. (2)

Exposure to repeated painful events can interfere with an infant's normal growth and development if not managed effectively. (3) Infants can experience acute and / or chronic pain therefore careful assessment and management can significantly minimise the intensity of pain.

Neonates requiring transfer are sometimes unavoidably exposed to painful stimuli due to preparation procedures required for safe transfers. It is important that sick neonates requiring transfer are effectively managed during potential painful experiences, whilst those requiring routine repatriation are transferred with minimal or no exposure to pain.

5 Assessment of pain

Neonatal pain assessment tools differ from the Paediatrics and adult generation tools, as they require behavioral indicators to assess pain. This is because Neonates are unable to communicate and verbalise their pain (3).

Pain Assessment tools facilitate in the overall subjective assessment of a patient and contributes to vital observations. Behavioral and physiological measurements are valid and reliable indicators of acute pain in the neonate and should determine the effectiveness of the current pain relief measures.

Every infant should be pain assessed regularly in order to promote successful pain management and comfort. Pain should be assessed using the NPASS tool (See Appendix 1) and documented on EPIC.

Pain should be assessed:

- When the transport team arrive
- 30 minutes after commencing or adjusting analgesia to establish effectiveness.
- 4 hourly/ as required if receiving analgesia
- One hour post operatively (then 4 hourly up to 48 hours post surgery)
- Hourly for those infants requiring opioids such as morphine infusion / fentanyl.
- Pre and post any invasive procedures

- **Please note:** those infants/neonates that are muscle relaxed are difficult to pain assess by behavioral responses, therefore physiological parameters are more useful indicators (this can include increased heart rate). It is important to be aware that this can also relate to those receiving inotropic support. (4)

Invasive procedures in relation to PaNDR

- Pre/ post Chest drain insertion
- Pre/ post endotracheal intubation
- Pre/post insertion of peripheral or umbilical lines

In addition to pain assessment, it is important to document rationale to interventions made and evaluate the effectiveness of pain management.

The Environment

Transfer of the infant can be an uncomfortable experience and increase stressors. Over-stimulation from environmental sources i.e. temperature, light, noise and handling, can cause extra stress and amplify pain perception. (Please refer to Developmental Care Guideline during Transport (5)).

Physiological expression of pain

Changes to heart rate, respiratory rate, blood pressure and perfusion may be an indicator of pain in the neonate. Hyperglycaemia may also indicate an infant stress/ pain response (6) (see Table 1)

Ventilated babies are more likely to breathe asynchronously if they are distressed. It is important to consider:

- Appropriate ventilation strategies (synchronised) Appropriate sedation
- Careful handling and positioning

Symptoms and signs

Lack of behavioural responses does not exclude pain

Physiological changes	Behavioural changes	Anatomical changes	Body movements
<ul style="list-style-type: none"> • Increase in: <ul style="list-style-type: none"> • heart rate • blood pressure • respiratory rate • oxygen consumption • mean airway pressure • muscle tone • intracranial pressure • skin blood flow • Decrease in: <ul style="list-style-type: none"> • oxygen saturation and transcutaneous oxygen levels • skin blood flow • Apnoea • shallow breathing • Fixed heart rate 	<ul style="list-style-type: none"> • Change in facial expression: <ul style="list-style-type: none"> • grimace • brow bulge • eye squeeze • deepening naso-labial furrow • nasal flaring • tongue curving or quivering • Crying • Whimpering • 'Silent' cry (intubated babies) • Decreased sleep • Heightened responses 	<ul style="list-style-type: none"> • Dilated pupils • Sweating • Flushing • Pallor 	<ul style="list-style-type: none"> • Fisting • Tremulousness • Thrashing limbs • Limb withdrawal • Writhing • Arching back • Head banging • Finger splaying • Cycling

- Sudden pain and distress may indicate acute deterioration e.g. bowel perforation
- **Physiological** changes cannot be sustained long-term

Table 1: Signs and Symptoms of pain in infants

Taken from: The Bedside Clinical Guidelines Partnership in association with the West Midlands Neonatal Operational Delivery Network

6. Non-pharmacological interventions

Painful Procedures

It is important to be aware of supportive measures that can be given during the procedure. During a stabilisation and transfer, painful procedures are often essential, however supportive steps can be used to aid comfort during these procedures:

- Swaddling
- Positive touch
- Pacifier
- Sucrose

(See Appendix 2)

Containment holding

Containment holding involves gentle continuous physical boundaries. This can be achieved by placing hands gently but continuously over the infant's head and legs (with the limbs in a flexed midline position to provide comfort).

Non-nutritive sucking

A pacifier with no fluid or nutrition being delivered

Sucrose

A non-pharmacological intervention that reduces pain responses. The greatest analgesic effect occurs when administered approximately two minutes before the painful stimulus. This coincides with the release of endogenous opioids. The effect lasts approximately four minutes. Repeating doses at two-minute intervals throughout painful procedure has been found to have an increased analgesic effect (5)

Sucrose is contraindicated in:

- Infants less than 27 weeks gestation.
- Infants being treated for NEC.
- If there are any neurological concerns affecting the suck, swallow or gag reflex.
 - Critically ill neonates receiving appropriate intravenous analgesia and sedation who have low pain scores on handling
- Neonates who are receiving muscle relaxant medication.
- Infants with a known fructose or sucrose intolerance.
- It should be used with caution if the infant has an endotracheal tube in situ.

Used with caution in:

- Babies at high risk of NEC.
- Babies with hyperglycaemia.
- Infants of diabetic mothers (during the initial post-delivery stabilisation period)

Sucrose guidance taken from: East of England Neonatal ODN: Pain management V4 Sep 2021-2024

7. Monitoring compliance with and the effectiveness of this document

The PaNDR team will monitor compliance with this document by undertaking regular audits; results will be presented to the senior PaNDR team.

8. References

1. Kumar, P., Sharma, R., Rathour, S., Karol, S. and Karol, M. (2019). Effectiveness of various nonpharmacological analgesic methods in newborns. *Clinical and Experimental Pediatrics*, [online] doi:<https://doi.org/10.3345/kjp.2017.05841>.
2. Hall, R.W. and Anand, K.J.S. (2014). Pain Management in Newborns. *Clinics in Perinatology*, [online] doi:<https://doi.org/10.1016/j.clp.2014.08.010>
3. Symington A, Pinelli J (2006) Developmental care for promoting development and preventing morbidity in preterm infants (review). *The Cochrane Database of*

Systematic Reviews. Issue 2. Art. No.: CD001814. DOI: 10.1002/14651858. CD001814.pub2.

4. Anand KJS, International Evidence-Based Group for Neonatal Pain (2006) Consensus Statement for the Prevention and Management of Pain in the Newborn: An update. *Pediatrics* 118(5): 2231 – 2241
5. Taddio A, Katz J, Ilersich A and Koren G (1997) Effect of Circumcision on Pain Response during Subsequent Routine Vaccination. *The Lancet* 349:599-603.
6. Puchalski M, Hummel P. (2002) The reality of neonatal pain. *Advances in Neonatal Care*. 2(5): 233 - 247.

9. Associated documents

- PaNDR guideline; Developmental care guideline during Transport <http://pandreastofengland.co.uk>
- EOE ODN Pain management Guideline, available at: <https://www.eoneonatalpccsicnetwork.nhs.uk/wp-content/uploads/2021/10/Pain-guideline.pdf>
- The Bedside Clinical Guidelines Partnership in association with the West Midlands Neonatal Operational Delivery Network <https://kids.bwc.nhs.uk/wp-content/uploads/2022/05/Neonatal-Guidelines-2019-21>

Equality and Diversity Statement

This document complies with the Cambridge University Hospitals NHS Foundation Trust service Equality and Diversity statement.

Disclaimer

It is the responsibility of all staff to ensure they are using the latest version of a document.

Document ratification and history			
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APPENDIX 1: NPASS Tool

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

Assessment Criteria	Sedation		Sedation/Pain	Pain / Agitation	
	-2	-1	0/0	1	2
Crying Irritability	No cry with painful stimuli	Moans or cries minimally with painful stimuli	No sedation/ No pain signs	Irritable or crying at intervals Consolable	High-pitched or silent-continuous cry Inconsolable
Behavior State	No arousal to any stimuli No spontaneous movement	Arouses minimally to stimuli Little spontaneous movement	No sedation/ No pain signs	Restless, squirming Awakens frequently	Arching, kicking Constantly awake or Arouses minimally / no movement (not sedated)
Facial Expression	Mouth is lax No expression	Minimal expression with stimuli	No sedation/ No pain signs	Any pain expression intermittent	Any pain expression continual
Extremities Tone	No grasp reflex Flaccid tone	Weak grasp reflex ↓ muscle tone	No sedation/ No pain signs	Intermittent clenched toes, fists or finger splay Body is not tense	Continual clenched toes, fists, or finger splay Body is tense
Vital Signs HR, RR, BP, SaO₂	No variability with stimuli Hypoventilation or apnea	< 10% variability from baseline with stimuli	No sedation/ No pain signs	↑ 10-20% from baseline SaO ₂ 76-85% with stimulation - quick ↑	↑ > 20% from baseline SaO ₂ ≤ 75% with stimulation - slow ↑ Out of sync/fighting vent

Premature Pain Assessment

+ 1 if <30 weeks gestation / corrected age

Appendix 2: Management of painful procedures

Procedure	Management
Capillary sampling.	<p>Consider venepuncture instead. Use right sized tenderfoot device for the infant. Consider giving sucrose with a pacifier (if consented). Consider skin-to-skin contact/breast feeding with the mother. Use swaddling or positive touch. Environmental measures. Position extremity downward to enhance blood flow. Avoid squeezing as this is the most painful part of the procedure and can lead to spuriously high potassium levels.</p>
Venepuncture, cannulation or arterial puncture.	<p>Consider sucrose with a pacifier (if consented). Environmental measures. Position extremity downward to enhance blood flow. Contain limbs to aid infant's effort to gain self-control. Provide boundaries. Second caregiver for support. Use swaddling or positive touch.</p>
Umbilical arterial/venous catheter (UAC) (UVC) insertion	<p>Use comfort holding/positive touch. Environmental measures. Consider sucrose with a pacifier (if consented). Consider administering morphine if ventilated. Provide boundaries.</p>
Intubation.	<p>For non-urgent intubation follow: Pre-medication for non-emergency endotracheal intubation in the neonate guideline.</p>
Extubation.	<p>Ensure second person for support. Use swaddling or positive touch. Environmental measures.</p>
Tracheal suctioning.	<p>Always use inline suctioning where possible. Use swaddling or positive touch. Comfort holding. Environmental measures. Provide boundaries.</p>
Chest drain.	<p>Anticipate the need for intubation and ventilation in spontaneously breathing infants. Positive touch. Provide boundaries. Use subcutaneous lignocaine. Consider sucrose with pacifier (if consented). Consider morphine bolus or paracetamol.</p>
Gastric tube insertion.	<p>Use swaddling or comfort holding. Positive touch. Environmental measures. Provide boundaries. Consider sucrose and pacifier (if consented).^[42]</p>