10/10/2021

Please be advised, this document has undergone an extensive review.

Education and documentation forms to be developed prior to implementation.

Current content and practices outlined within this document must be followed until further notice.

CLINICAL GUIDELINE	
Post-Operative: Analgesia	
Scope (Staff):	Nursing and Medical Staff
Scope (Area):	NICU KEMH, NICU PCH, NETS WA

This document should be read in conjunction with this DISCLAIMER

Management

- Review pre op history, especially recent narcotic exposure.
- Review surgical and anaesthetic notes.
- General post-op assessment in the neonatal ward.
- Document pain scores on a **Pain Chart**.
- Minimal handling.
- For minor procedures use non-pharmacological methods and/or Paracetamol as per unit protocol if pain scores are < 10.
- For major procedures start a Morphine infusion at 10-20 mcg/kg/hour. Consider bolus doses of 10-20 mcg/kg. Fentanyl infusions of 1-2 mcg/kg/hour are equipotent to Morphine 10-20 mcg/kg/hour and may be preferred in a baby with recent Morphine exposure or to cycle Morphine and Fentanyl in prolonged analgesia.
- Older babies or those on pre-op narcotics may need higher doses of Morphine (30-40 mcg/kg/hour) initially.
- Midazolam infusions at 1-2 mcg/kg/hour can spare narcotic use and aid sedation.
- Paracetamol (IV) should be used 24 hours after major surgery as a narcotic sparing agent.
- Wean Morphine when pain scores are < 7. Unnecessarily high narcotic infusions can lead to significant side effects (see below).
- Anaesthetic Pain Service is available for consultations in unusual circumstances.

Please remember **we should not tolerate a baby in pain**; every baby is different; seek senior team members' advice when a baby is not following the 'usual path'.

Neonatal post-operative pain is a frequent problem. Nociceptive (pain) pathways exist by 24 weeks gestation; therefore all post-op babies will require some form of analgesia. Pain will vary according to the type of surgery, presence of intercostal catheters, the degree of handling needed, tolerance to opioids and many other individual variations. All post-operative babies **must** have their pain scores monitored and documented as outlined in the Pain Assessment and Management guideline.

Pain assessment should start by quickly reviewing the patient's history and, in particular, the immediate surgical and anaesthetic record. Note the type, timing and doses of analgesia administered (opioid, Ketamine, Paracetamol etc.) during surgery and the use of regional analgesia (caudals/epidurals or wound infusions) and whether neuromuscular paralysis has worn off. Post-operative pain assessment should include review of non-analgesic factors such as blood gas etc. and chest X-ray. These factors may cause a "distress" and may influence analgesic requirement (e.g. poor ETT position or ventilation could cause agitation and should be corrected before increasing analgesia/sedation).

Post-operative pain is dynamic with analgesic needs fluctuating during the day. Typically babies require more analgesia with handling and procedures (e.g. dressing change) and less during "rest". Effective analgesic regimens require a pro-active plan for managing breakthrough pain (e.g. bolus of narcotic infusion). The ideal situation is to prevent unnecessary pain and a clear individual plan made with **frequent review of progress**. Break through pain should be quickly brought under control but equally important, medications should be reduced as pain scores improve.

Non pharmacological strategies include swaddling, breastfeeding, tactile/ aural stimulation and eye contact. The administration of sucrose on a pacifier is an effective analgesic especially to improve procedure related pain.

All major surgery, e.g. opening a body cavity, will require post-operative narcotics over the first 24-48 hours post-op. Almost always these neonates will be ventilated for various reasons including the ability to give adequate narcotics and safely manage **narcotic induced hypoventilation/apnoea**. Neonates require lower doses of opioid compared with infants and children due to pharmacokinetic differences resulting in increased production of morphine 6 glucuronide (active and potent) and reduced renal clearance. Generally, morphine infusions of 5-20 mcg/kg/hour with bolus doses of 10 mcg/kg or **Fentanyl** infusions of 0.4-0.8 mcg/kg/hour with bolus doses of 0.2 mcg/kg may be prescribed for a term neonate. A failure to adequately wean narcotic doses as pain settles down can cause prolonged, unnecessary ventilation.

Other narcotic side effects regularly include **urine retention** requiring gentle expression or urine catheters; a full bladder can itself cause significant discomfort. **Hypotension:** especially if the baby is acidotic, septic or hypovolemic (blood loss). Opioid induced **pruritus** (itching) manifests as scratching/rubbing over the face and neck (managed with IV Naloxone, 1 mcg/kg (up to 2 hourly/PRN) and/or switching or ceasing opioids (if possible). **Morphine "startling"** is common and if troublesome reduce dose or switch to Fentanyl.

Analgesic Adjuvants

Clonidine is a selective alpha 2 agonist and may be administered orally (preferred) or IV. Usually administered intermittently (rather than by infusion) and lasts for 4-6 hours. Starting dose: 0.5-1 mcg/kg, oral, 2-4 times a day. **Usually well tolerated and causes sedation without respiratory compromise, therefore useful in non-ventilated babies**. Clonidine maybe used as an analgesic adjuvant when opioid doses are escalating or patients are agitated/irritable and difficult to settle to promote sleep and to reduce or treat opioid withdrawal. When Clonidine is added to caudal/epidural blocks, it increases

analgesic efficacy and prolongs block duration. Clonidine may cause hypotension and bradycardia.

Dexmedetomidine activates alpha-2 receptors in the locus ceruleus (brain) and sympathetic nervous system resulting in sleep, sedation and relief of withdrawal symptoms and by activation of peripheral a-2 receptors. Dexmedetomidine has been demonstrated to be safe and effective in a number of case series in infants and children (including neonates). Safety has been demonstrated in doses up to 2 mcg/kg/hour although the most commonly used dose range is 0.2-1 mcg/kg/hour. (Hünseler et al)

Spinal anaesthesia maybe performed to avoid a GA in ex-preterm neonates having inguinal hernia surgery. The block is short lived (< 2 hours) and provides adequate surgical anaesthesia for the duration of the operation.

A caudal block usually involves a single dose of local anaesthetic (LA) via the sacral hiatus into the epidural space. The block usually lasts 6-12 hours depending on the dose of LA and whether clonidine was added. **Most neonatal epidural infusions cease after 48 hours due to concerns of potential accumulation of LA and consequent neurological toxicity.**

Wound infusions typically deliver 0.2% Ropivacaine at 0.1 mL/kg through a fenestrated catheter into a surgical wound as a supplemental analgesic technique. They are generally effective and can be used for 24-48 hours. Leakage around the site is not uncommon and the catheter may still be used if it is effective and leakage is not profuse and there is no subcutaneous accumulation.

Thank you to Dr Priya Thalayasingam; Paediatric Anaesthetist and Pain Service Consultant, PMH.

Related CAHS internal policies, procedures and guidelines
Neonatology Guideline • Pain Assessment and Management Neonatology Medication Protocol • Fentanyl • Midazolam • Morphine • Paracetamol

References and related external legislation, policies, and guidelines

1. Deindl. Successful implementation of a neonatal pain and sedation protocol at 2 NICUs. Pediatrics.2013;132::e211–e2
2. Hall R W, Anand KJS. Pain management in newborns. Clin Perinatol 2014; 41: 895–924.
3. Hünseler etal. Continuous infusion of clonidine in ventilated newborns and infants: a randomized controlled trial. Pediatr Crit Care Med. 2014; 15: 511–522.
4. Lonnqvist M. Postoperative analgesia in infants and children.Br J Anaesth. 2005; 95: 59–68.
5. Nemergut et al. Sedation and analgesia to facilitate mechanical ventilation. Clin Perinatol. 2013; 40: 539–558.

This document can be made available in alternative formats on request for a person with a disability.

File Path:			
Document Owner:	Neonatology		
Reviewer / Team:	Neonatal Coordinating Group		
Date First Issued:	January 2016	Last Reviewed:	1st February 2016
Amendment Dates:		Next Review Date:	1st February 2019
Approved by:	Neonatal Coordinating Group	Date:	February 2016
Endorsed by:	Neonatal Coordinating Group	Date:	February 2016
Standards Applicable:	NSQHS Standards: 		
Printed or personally saved electronic copies of this document are considered uncontrolled			