PAIN MANAGEMENT GUIDELINE

Rationale

Babies nursed on neonatal units are exposed to numerous painful procedures as part of their treatment and management. It is now widely recognised that babies do feel pain and premature babies are more sensitive to pain (Anand 1998). Prolonged or severe pain causes significant short and long term physiological, behavioural, hormonal and metabolic changes (see Appendix) that may increase morbidity and mortality and alter subsequent responses to pain (Anand *et al* 1997; Johnston & Stevens 1996). The philosophy of the Trevor Mann Baby Unit is that no infant should suffer any avoidable pain or discomfort and that the individual needs of each baby should be considered. It is important to consider non-pharmacological measures such as containment holding, swaddling, positioning.

For drugs and doses please refer to the updated formulary in the nurseries or on our website:

Prescribing guidelines

Practice

1. ELECTIVE INTUBATIONS

Practitioners who are not familiar with this type of regime should receive training and support initially.

Laryngoscopy and intubation can provoke profound stress resulting in bradycardia, hypoxia and a rise in intracranial pressure (DeBoer & Peterson 2001) but use of the above medication may reduce these harmful responses. Providing the airway of the baby can be safely maintained during drug preparation, each infant should, therefore, receive these intubation drugs in the order stated above. Since opiates can cause hypotension, it is wise to check the infant's blood pressure prior to administration. However, if borderline or low consider fluid bolus or inotrope support, if necessary. Suxamethonium may cause reactive bradycardia, although this is generally prevented by atropine, and chest splinting. Paralysis usually occurs after approximately thirty seconds and generally lasts three to five minutes, but may be longer in individual babies. If intubation is unsuccessful, seek experienced help, immediately. If ventilation is to be continued, see section two of the guideline.

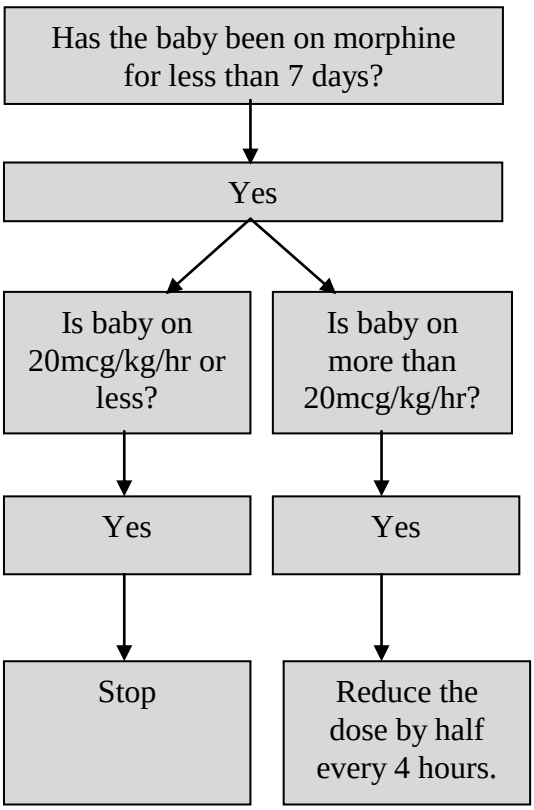
2. MANAGEMENT OF THE VENTILATED INFANT

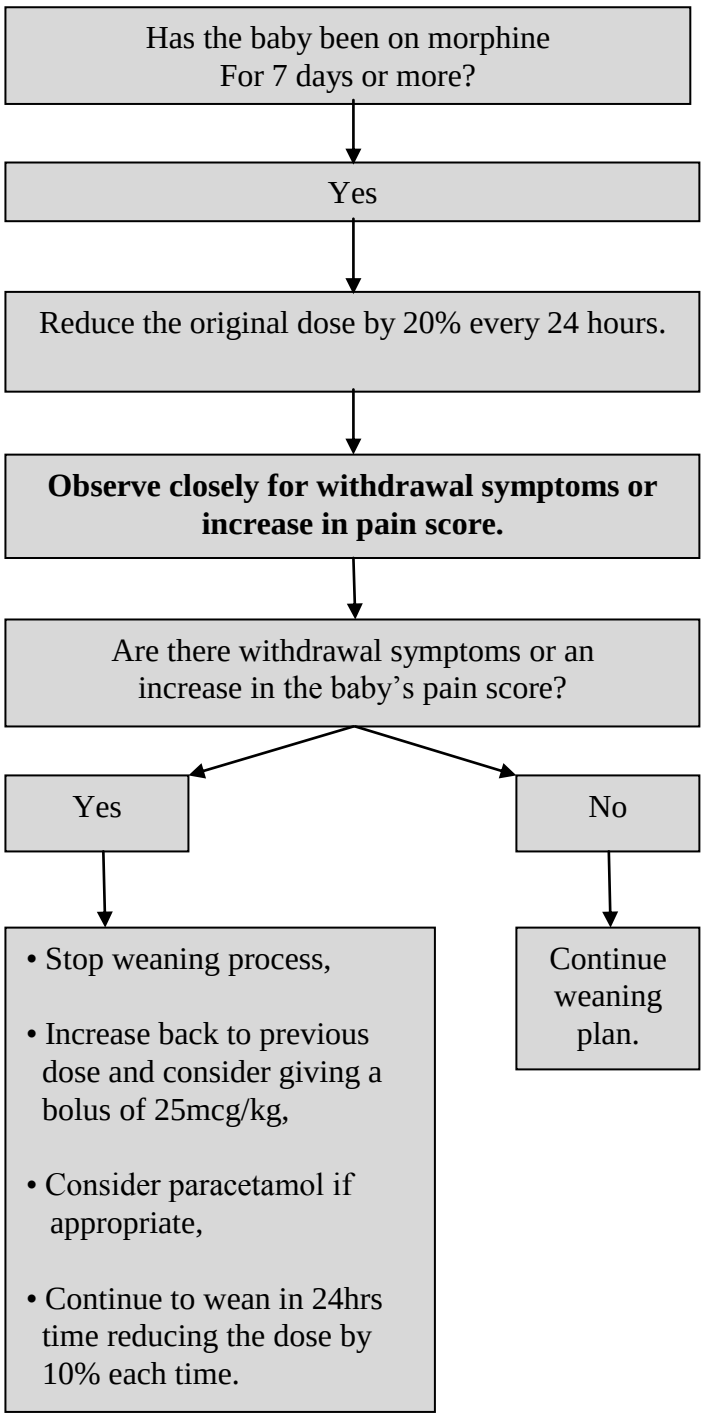
Analgesia/sedation should be considered for all babies receiving continued ventilation. Continuous morphine infusion, during ventilation, reduces adverse responses during endotracheal suctioning and may improve neurological outcome (Anand *et al* 1999). Therefore,

once it is clear that the infant will require continued ventilatory support, a morphine infusion should be considered. If the baby has already received an initial dose of opiate on intubation, the loading dose of morphine may not be necessary. When an infant becomes unsettled on a morphine infusion, consider optimising ventilatory support, the potential need for suction, neurological agitation and environmental influences before increasing the morphine. Assess infant pain (using the SCREAMS pain assessment tool) and titrate the morphine infusion to response. If a baby remains unsettled on maximum doses of morphine, consider an additional bolus of 50mcg/kg. Midazolam may also be considered under consultant guidance, as at present, current evidence does not support the use of regular midazolam for sedation in preterm infants (The Cochrane Review 2001). It is vital that any infant who is receiving paralysing agents has adequate pain relief, with a continuous opiate infusion. Remember that a baby who is ventilated for more than one week and on full enteral feeds, without the need for intravenous access, may be changed to regular oral morphine, although it is important to remember that the bioavailability of oral morphine is approximately 50% of intravenous morphine, therefore the hourly mcg/kg/hr dose should be doubled and given 4 hourly. Again, if an infant who is receiving opiates becomes hypotensive, seek and treat all possible causes before reducing morphine.

Brighton and Sussex University Hospitals NHS Trust

Morphine (Oral and I.V.) Weaning Process





It is important that the baby is assessed constantly at each stage. If you have any concerns please seek further assistance.

MORPHINE WEANING REGIME

Extubation must be anticipated early so that appropriate weaning of morphine may be initiated. However, it is possible for a baby to be successfully extubated while receiving morphine, providing the baby has adequate respiratory drive. See weaning flow chart (page 3). Oral morphine can be weaned in the same way as I.V. morphine. It may be appropriate to consider alternative analgesics, such as regular paracetamol, during the weaning process.

3. PAINFUL PROCEDURES

Morphine may be considered prior to chest drain insertion (in addition to the local anaesthetic lignocaine 1%), longline insertion, large/deep wound dressing changes, lumbar puncture or peripheral arterial line insertion. In the unventilated infant, use lower doses of morphine and check blood pressure prior to administration. An apnoea monitor should be used for the following 24 hours.

Paracetamol may be considered during weaning from opiates, prior to immunisations, wound dressing changes or as a mild analgesic. Paracetamol suppositories are available in 15mg, 30mg and 60mg (although pharmacy will need considerable notice to obtain 15mg suppositories). Suppositories may only be given whole or in half (if cut lengthways once) and doses should, therefore, be prescribed accordingly.

Ametop (topical amethocaine) may be used from birth on any infant who is greater than thirty-two weeks gestation (Moore and Stretton 2001). However, any infant less than thirty-two weeks gestation must be at least two weeks old before Ametop may be used (to allow time for the skin to mature). Apply the ametop to the specific area (one tube will cover two sites) and place a tegaderm dressing over the area. Do not leave on for longer than 30 minutes and remove excess cream with gauze. The effects should last for between one to five hours. Ametop should only be applied to two sites at any one time and exposure should not be repeated within the same twenty four hour period. Ametop may be considered for venepuncture, cannulation, peripheral arterial line insertion, longline insertion, lumbar puncture and supra pubic aspiration. Ultrasound of the bladder should also be performed prior to supra pubic aspiration to allow assessment of the fullness of the bladder which will help avoid numerous attempts. Ametop is not effective for heel prick sampling, although venepuncture is known to be less painful and is, therefore, the preferred method for taking blood (Shah & Ohlsson 2001).

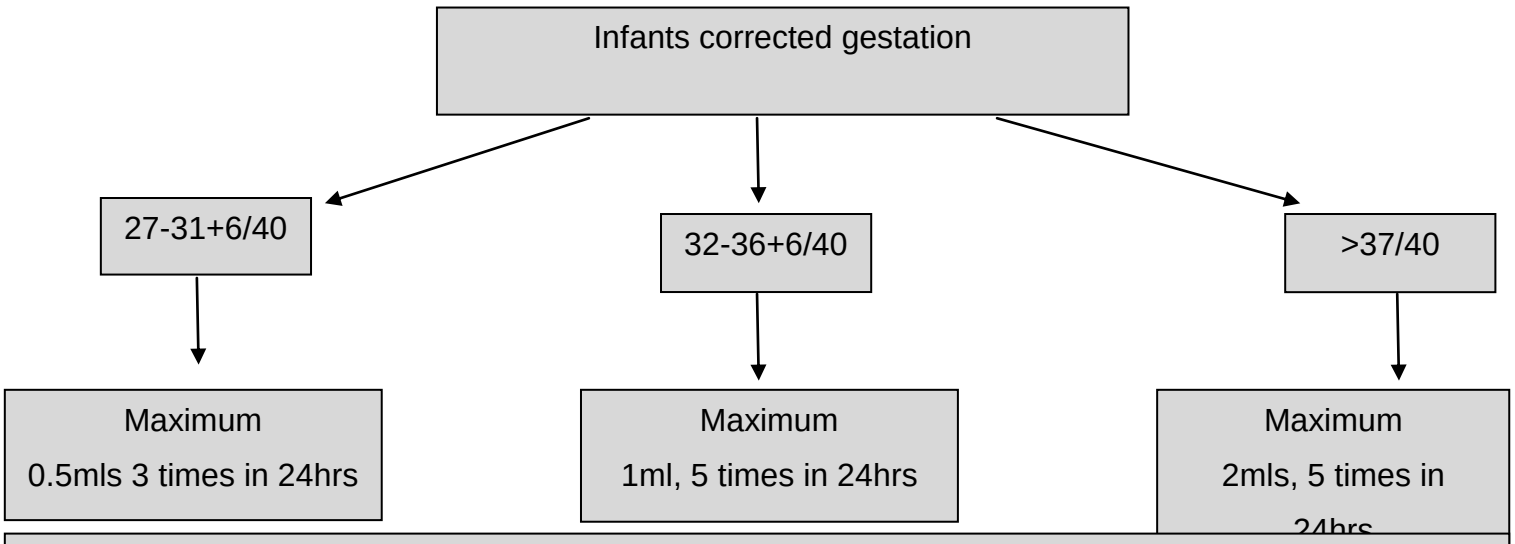
Sucrose can be used prior to minor procedures, including venepuncture, cannulation, heel prick, I.M./S.C. injection, dressing changes and eye examination (Lefrak 2006). Sucrose should

be administered on to the anterior tongue up to 2 minutes prior to procedure (Stevens *et al* 2001). The onset of action is within 10 seconds and duration is for up to 10 minutes (Lefrak et al 2006). Blass (1995) suggests sucking (on breast, pacifier or gloved finger) induces feeling of calm and reduces pain reduced stress (Campos 1994). Note a pacifier dip is 0.2mls of sucrose. There is no published research regarding dosage limits and frequency, therefore the smallest amount of sucrose should be used to achieve desired response (Lefrak et al 2006).

Sucrose should not be used if there are medical concerns regarding necrotizing enterocolitis (NEC), if the infant is paralysed or has an absent gag reflex. For the ventilated baby start with 0.05mls of sucrose put directly on to the tongue and assess tolerance, the amount given may be increased up to the prescribed volumes if required and as tolerated (Lefrak et al 2006). As sucrose is classed as a food substance it does not have to be prescribed by a doctor. However, in order to ensure a written record of when sucrose has been administered, pre-printed stickers can be utilised on the PRN side of the drug chart. Mike Pettit (pharmacist) has agreed that a prescriber's signature is not required. A separate nursing guideline and a parent information leaflet are available about sucrose administration.

At the end of 2007, Belgium and France ceased to use sucrose following a death from undiagnosed hereditary fructose intolerance. In light of this information, this guideline will be reviewed for possible changes in recommendations. Until then it is vital that medical staff use their clinical judgment when deciding whether to utilise sucrose as a mechanism of pain relief for neonates.

Sucrose



A dummy dip = 0.2mls of sucrose

If the baby is ventilated start with 0.05mls of sucrose and assess tolerance.

N.B. Should not be given to babies who are paralysed, have an absent gag reflex or those infants where there are medical concerns regarding NEC.

At the end of 2007, Belgium and France ceased to use sucrose following a death from undiagnosed hereditary fructose intolerance. In light of this information, this guideline will be reviewed for possible

4. **POST TRAUMATIC DELIVERY**

Paracetamol should be considered for the infant who has had a traumatic delivery e.g. forceps, Ventouse extraction. However, it is also important to reduce environmental stimulation (noise, light, handling), in these babies.

5. POST OPERATIVE MANAGEMENT

For ventilated patients see section two of the guideline. When weaning morphine, it is also important to add regular paracetamol. For unventilated babies, morphine may be administered with caution. Respiratory drive should be assessed and an apnoea monitor used. Wean or titrate morphine as described in section two of the guideline. Codeine phosphate may also be used for managing postoperative pain management. Caution is needed for infants with renal or hepatic impairment (dose may be reduced or avoided, as necessary) (BNF for children 2008).

6. CHRONIC LUNG DISEASE

Babies with chronic lung disease may have added complications, such as long-term CPAP (continuous positive airway pressure), hernias and gastro-oesophageal reflux and, as a result, may become agitated. Chloral hydrate is a sedative that can be used for this group of babies to help them settle. **However, chloral hydrate should not replace pain relief and should not be prescribed regularly due to the risk of accumulation** (Northern Neonatal Network 2007). Doses should, therefore, be prescribed as required on the PRN part of the drug chart and reviewed daily on the ward round.

References

- Anand, K.J. 1998. Clinical importance of pain and stress in preterm neonates. *Biol. Neonate* 73: 1-9.
- Anand, K.J., B.A. Barton, N. McIntosh, H. Lagerkrantz, E. Pelausa and T.E. Young. 1999. Analgesia and sedation in preterm neonates who require ventilatory support: results from the NOPAIN trial. *Archives of Pediatric Adolescent Medicine* 153: 331-338.

- Anand, K.S., R. Eckstein Grunau and T.F. Oberlander. 1997. Developmental character and long term consequences of pain in infants and children. *Child and Adolescent Psychiatric Clinics of North America* 6(4): 703-723.
- Blass, EM. A, Shah. 1995. Pain reducing properties of sucrose in human newborns. *Chemical Senses* 20: 29-35.
- *British National Formulary for Children*. 2008. London: BMJ.
- Campos, RG. 1994. Rocking and pacifier; two comforting interventions for heel stick pain. *Research Nursing Health* 17: 321-331.
- DeBoerr, S.L. and L.V. Peterson. 2001. Sedation for nonemergent neonatal intubation. *Neonatal Network* 20(7): 19-23.
- Johnston, C.C. & B.J. Stevens. 1996. Experience in a neonatal intensive care unit affects pain response. *Pediatrics* 98: 925-930.
- Lefrak, L. J, Duncan. C, Martin-Walters. K, Toczylowski. 2006. Sucrose Analgesia: Identifying Potentially Better Practices. *Pediatrics* 118: S197-S202
- Moore, J. and J. Stretton. 2001. Assessment of the benefits of topical anaesthetic application prior to intravenous cannulation: a study of local amethocaine gel in the neonate. *Journal of Neonatal Nursing* 7: 63-67.
- Northern Neonatal Network. 2007. *Neonatal Formulary.* 5th ed. London: BMJ Books.
- Shah, V. and A. Ohlsson. 2001. Venepuncture versus heel lance for blood sampling in term neonates. *The Cochrane Library* Oxford: Update Software.
- Stevens, B.J., J. Yamada and A. Ohlsson. 2001. Sucrose analgesia in newborn infants undergoing painful procedures. *The Cochrane Library* Oxford: Update Software.
- The Cochrane Review. 2001. Intravenous midazolam infusion for sedation of infants in the neonatal intensive care unit. *The Cochrane Library* Oxford: Update Software.

Appendix

It is vital that response to analgesics is monitored, by using the SCREAMS pain assessment tool. The following cues may indicate pain responses:

BEHAVIOURAL SIGNS:

- Facial expression e.g. cupped tongue, brow bulge, grimace
- Crying (may be silent if intubated)
- Body posture e.g. splayed digits, arching, hand swiping

PHYSIOLOGICAL SIGNS:

- Heart rate (increase or decrease)
- Blood pressure (increase)
- Respiratory rate (increase or decrease)
- Oxygen saturations (decrease)
- Palmar sweating (rarely seen in <36/40)
- $PaCO_2$ (increase)
- Intracranial pressure (increase)
- Core/peripheral temperature (widening)
- Hormonal and metabolic changes e.g. increased glucagon, decreased insulin, increased cortisol