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1. Introduction and Who Guideline applies to

This guideline is aimed at all Health Care Professionals involved in the care of infants within the Neonatal Service.

Aims:

- To provide a structured approach to the assessment and management of an unsettled baby
- To provide guidance on the appropriate management of pain and distress in newborn infants
- To maximise beneficial effects of pain-relieving interventions and minimise adverse effects of drug therapy

Related UHL documents:

- [Premedication for Neonatal Intubation UHL Neonatal Guideline](#) Trust ref: C13/2007
- [Less Invasive Surfactant Administration \(LISA\) UHL Neonatal Guideline](#) Trust ref: C47/2020

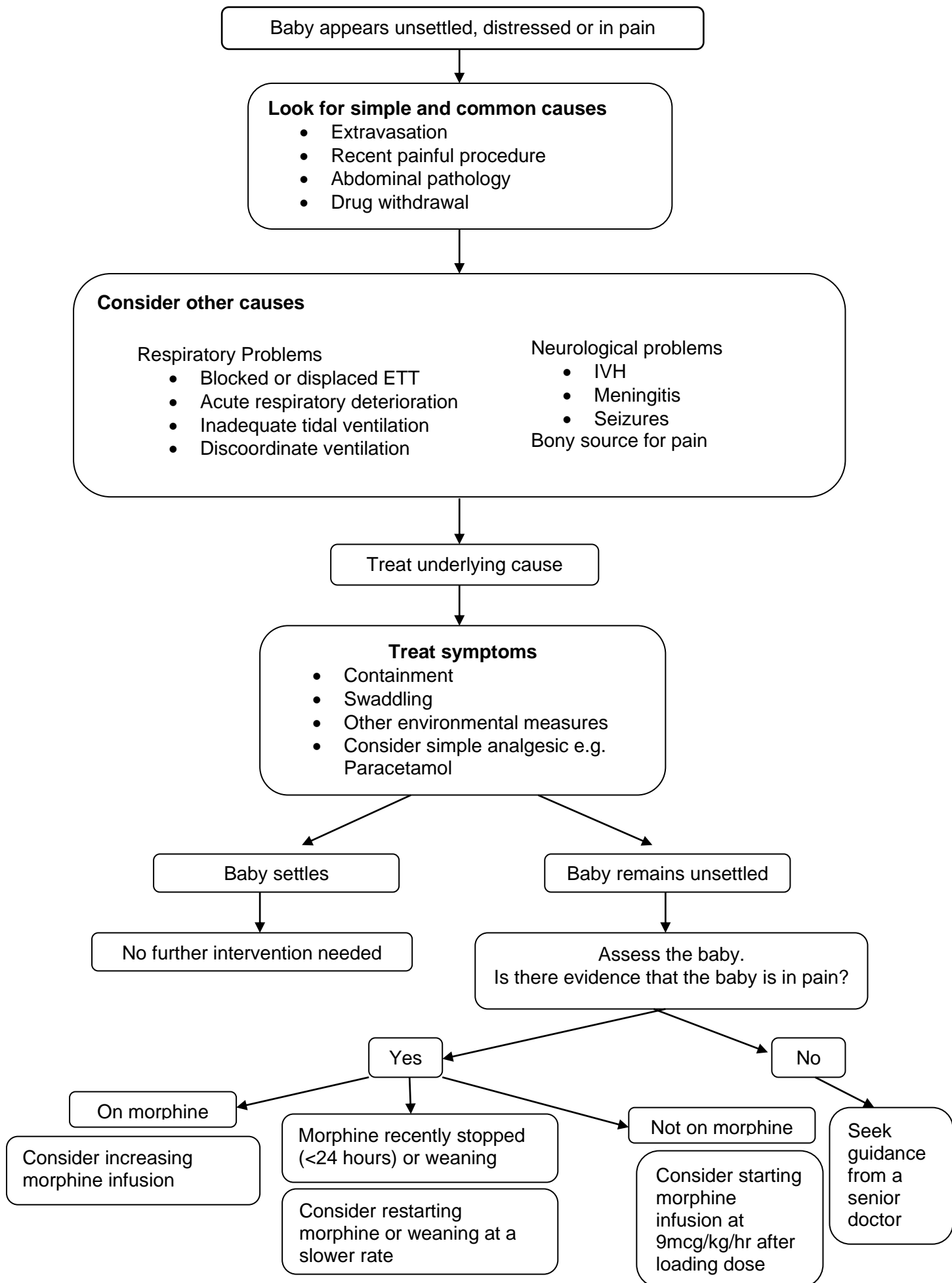
Key Points:

	Grade of Evidence
1. Use a structured approach to the management of an unsettled baby (see flow chart)	C
2. Avoid unnecessary invasive procedures	C
3. Use simple environmental or behavioral interventions before considering drug therapy	C
4. Sucrose solution for procedural pain (see below) <ul style="list-style-type: none"> • Give one drop at a time onto the tongue to avoid choking/gagging 	A
5. Premedication for planned intubation: Fentanyl + Suxamethonium +/- atropine are recommended (see below)	A
6. Morphine for ongoing pain: <ul style="list-style-type: none"> • Assess need for analgesia before starting morphine; regularly review continuing need • Use lowest possible dose to achieve desired analgesic effect • Maintenance of 9 micrograms/kg/hour is appropriate for most babies. 	A / C

Evidence according to RCPCH

Grade A	At least 1 randomised controlled trial addressing specific recommendation
Grade B	Well conducted clinical trials but no randomised trial on specific topic
Grade C	Expert committee report or opinions

Management flowchart



2. Guidelines / recommendations

2.1 General principles

- Avoid unnecessary painful procedures
- Use indwelling lines for blood sampling if present
- Venepuncture is less painful than heel prick ^(A)
- Non-nutritive sucking and sucrose may have additive effects ^(A)
- Whenever possible, get some help with procedures
- Individually assess each baby and tailor pain relief to match the intervention

2.2 Pain assessment

No single validated pain assessment score is suitable for use in all situations. Facial expression is the most sensitive indicator of acute pain. Observe all infants for changes in expression that may represent responses to pain.

These are:

- Brow bulge
- Eye squeezing
- Nasolabial furrowing

There may also be changes in physiological parameters such as:

- Increased heart rate
- Increased blood pressure
- Decreased SaO₂

However, these changes are non-specific and frequently do **not** indicate pain

Features of ongoing or persistent pain are less easily recognised. Facial features may not be easily identifiable in ventilated babies. Some babies appear to respond to very severe persistent pain by lying extremely still and showing no expression.

2.3 Sucrose solution

The analgesic effects of sweet solutions are mediated through taste. Sucrose and glucose are effective for reducing pain responses associated with invasive procedures (A). They do not have sedative effects and therefore should not be used to “settle” irritable babies.

Suitable for babies of more than 28 weeks of gestation*

SUCROSE 24% (Algopedol)	(NOT per kg)
< 37 ⁺⁰	0.2 – 1.0ml
>37 ⁺⁰ kg	0.2 – 2.0 ml

*preterm infants up to 4 times per 24 hours

*full term infants up to 6-8 times per 24 hours

- Give **one drop at a time** onto the tongue to avoid choking/gagging

The following groups of babies should **not** receive sucrose:

- Babies who are receiving nothing by mouth (can discuss with consultant)
- Oesophageal atresia or tracheo-oesophageal atresia (pre-op)
- Ventilated or unstable infants

2.4 Topical anaesthetics

There have been a small number of studies on topical anaesthetics in neonates. Evidence is limited in regard to its benefit in the babies. Consider using Amitop in term babies for lumbar puncture where administration will not delay the initiation of the treatment. This will be in addition to the Sucrose.

2.5 Management of acute procedural pain

Procedure	Recommendations	Evidence
Heel prick	<ul style="list-style-type: none"> • Always use a spring-loaded device • Containment or swaddling • Consider skin to skin contact or breast feeding • Sucrose solution • Do NOT use topical anaesthetic cream 	<p>B</p> <p>B</p> <p>A</p> <p>A</p>
Venepuncture	<ul style="list-style-type: none"> • Containment or swaddling • Consider skin to skin contact with mother or breast feeding • Sucrose solution 	<p>B</p> <p>A</p> <p>A</p>
Venous cannulation	<ul style="list-style-type: none"> • Containment or swaddling • Sucrose solution • Consider the use of topical anaesthetic cream 	<p>B</p> <p>A</p> <p>A</p>
Arterial or long line insertion/ arterial puncture	<ul style="list-style-type: none"> • Containment or swaddling • Sucrose solution 	<p>B</p> <p>A</p>
LP / ventricular tap / SPA	<ul style="list-style-type: none"> • Sucrose solution • Consider the use of topical anaesthetic cream (Ametop 4%, small “pea-sized” amount spread over 1-2cm area 30-60 mins before procedure) (<i>NB. Do not delay urgent procedures</i>) 	<p>A</p> <p>A</p>
Chest drain insertion	<ul style="list-style-type: none"> • Morphine sulphate 100 micrograms/kg iv injection over 1-5 minutes • Consider continuous infusion of morphine 9 micrograms/kg/hour • Local anaesthetic infiltration (up to 3mg/kg Lignocaine (0.3ml/kg of 1% solution) 	<p>B</p> <p>B</p> <p>B</p>

Eye examination	<ul style="list-style-type: none"> • Containment or swaddling • Sucrose solution 	B A
Endotracheal intubation	<p>On labour ward: There is no place for premedication before intubation at delivery; establishment of a secure airway ± surfactant administration is the immediate priority.</p> <p>On the neonatal unit: (See Premedication for Intubation Policy). Always use premedication prior to intubation unless baby cannot be adequately mask ventilated while awaiting preparation of medication</p>	A

Premedication for Intubation regime (also see separate guideline):

Fentanyl + Suxamethonium +/- atropine are recommended:

<p>Fentanyl 3-5 microgram/kg IV</p>	<p>Give once prior to intubation Infusion as a slow bolus over 3-5 minutes</p> <p>Consider using 3 microgram/kg if baby has hypoplastic left heart syndrome or other complex congenital heart disease or a previous history of chest wall rigidity after fentanyl</p> <p>Have naloxone, suxamethonium, atropine available</p>
<p>Suxamethonium 2 mg / Kg IV</p>	<p>Suxamethonium is a paralysing agent. It should be given only after establishing that effective bag / mask or NeoPuff ventilation is possible. It has a short duration of action. It is associated with bradycardia and must not be given unless atropine is drawn up and ready to use. Do not use in babies with neuromuscular problems.</p> <p>A 2nd suxamethonium dose can be given if necessary.</p>
<p>Atropine 20 microgram /Kg IV</p>	<p>Only to be used if clinically indicated to reverse intubation induced bradycardia. Dose can be repeated if necessary.</p>

If a baby is already on a morphine infusion:

Assess clinically how active the baby is. Is further sedation needed? If it is, then use Fentanyl as above.

Management of Ongoing Pain or Distress

On admission to the neonatal unit, use simple measures to make a baby comfortable and make an assessment **before** prescribing drug therapy.

Environmental / Behavioral measures

- Containment
- Swaddling
- Skin to skin contact with mother or breast feeding
- Non-nutritive sucking (parental information sheet provided)

Pharmacological measures

- Mild or moderate pain: if baby is tolerating feeds use oral or rectal paracetamol
- Severe pain: intravenous opiate infusion (most commonly morphine) and/or paracetamol (see drug monograph) are the drugs of choice.
- Paracetamol used in conjunction with an opiate may allow reduction in the dose of opioid (Refer to Neonatal Formulary)

Morphine

- Most widely used opiate in neonates
- Has both analgesic and sedative effects
- Prolonged duration of action
- Reduces behavioral and hormonal stress responses
- Improves synchrony with mechanical ventilation

Dose:

- Morphine 10mcg/kg/hr is usually adequate
- Up to 30mcg/kg/hr may *very occasionally* be required for a short time postoperatively or in severe inflammatory conditions;
- Use the minimum effective dose

Morphine use is not without risk. Recognised adverse effects include:

- Hypotension (particularly in infants who have low/borderline blood pressure before morphine administration),
- Prolonged ventilation
- Feed intolerance

Higher doses produce more adverse effects. As with all medications, use morphine judiciously, with caution and in appropriate circumstances. Use it only when there is good reason to believe that a baby is very distressed or in pain or when anticipating severely painful procedures.

There is never a case for starting morphine therapy solely because a baby is ventilated or solely because a baby is very active.

NB. Always document reasons for starting morphine infusion

Weaning of Morphine Infusion

There is little published evidence regarding weaning of therapeutic doses of morphine in neonates. Withdrawal in preterm babies is not well defined and signs may be different from those in term babies with NAS.

- Review the baby's need for morphine regularly and at least daily
- Give the smallest dose for the shortest time to achieve desired effect
- Wean if morphine has been given for more than 2 days.
- If a baby requires an infusion only for weaning morphine, discuss with a senior person before resisting a 'tissued' cannula.

Duration of infusion	Suggested strategy for weaning morphine
< 2 days	Stop infusion; weaning not necessary
2-4 days	Wean rapidly: decrease infusion to 50% of original dose for 8 hours, then to 25%. Aim to discontinue infusion within 24-48 hours of starting weaning process.
> 4 days	Wean slowly: decrease infusion by 20% of original dose every 12 hours, then stop. If irritability develops, increase to the previous dose and wean more slowly

3. Education and Training

None

4. Audit Standards

1. Oral sucrose before procedures (auditable procedures: long line insertion, ROP screening) (80%)
2. Premedication to be given for planned (re)intubation on NNU (80%)
3. Reason for commencing morphine infusion documented (80%)

5. Supporting References

1. Anand, K. J. et al. Effects of morphine analgesia in ventilated preterm neonates: primary outcomes from the NEOPAIN randomised trial. *Lancet* **363**, 1673-1682 (2004).
2. Boyle, E. M. et al. Pain relief in screening for retinopathy of prematurity. *Pediatr.Res.* 55[4], 530A. 2004.

3. Carbajal, R., Lenclen, R., Gajdos, V., Jugie, M., & Paupe, A. Crossover trial of analgesic efficacy of glucose and pacifier in very preterm neonates during subcutaneous injections. *Pediatrics* **110**, 389-393 (2002).
4. Foster, J.P., Taylor, C., Spence, K. Topical anaesthesia for needle-related pain in newborn infants. *Cochran Database Syst Rev*. CD0103321. (2017)
5. Gray, L., Miller, L. W., Philipp, B. L., & Blass, E. M. Breastfeeding is analgesic in healthy newborns. *Pediatrics* **109**, 590-593 (2002).
6. Grunau, R. V., Johnston, C. C., & Craig, K. D. Neonatal facial and cry responses to invasive and non-invasive procedures. *Pain* **42**, 295-305 (1990).
7. Johnston, C., Campell-Yeo, M., Disher, T., Benoit, B., Fernandes, A., Streiner, D., et al. Skin-to-skin care for procedural pain in neonates. *Cochrane database Syst Rev*. (2017)
8. Slevin, M., Murphy, J. F., Daly, L., & O'Keefe, M. Retinopathy of prematurity screening, stress related responses, the role of nesting. *Br.J.Ophthalmol.* **81**, 762-764 (1997).
9. Stevens, B., Yamada J., Ohlsson, A. Haliburton S., Shorkey A. Sucrose for analgesia in newborn infants undergoing painful procedures. *Cochrane.Database.Syst.Rev*. CD001069 (2016).
10. Ward-Larson, C., Horn, R. A., & Gosnell, F. The efficacy of facilitated tucking for relieving procedural pain of endotracheal suctioning in very low birthweight infants. *MCN Am J.Matern.Child Nurs.* **29**, 151-156 (2004).

6. Key Words

Algopedol, Atropine, Fentanyl, Premedication, Sucrose solution, Suxamethonium, Unsettled

The Trust recognises the diversity of the local community it serves. Our aim therefore is to provide a safe environment free from discrimination and treat all individuals fairly with dignity and appropriately according to their needs. As part of its development, this policy and its impact on equality have been reviewed and no detriment was identified.

CONTACT AND REVIEW DETAILS			
Guideline Lead (Name and Title) Author: Prof. Elaine M. Boyle S Mittal – Consultant guidelines lead		Executive Lead Chief Medical Officer	
Details of Changes made during review:			
Date	Issue Number	Reviewed By	Description Of Changes (If Any)
April 2010	1	EMB	Original guideline
Mar – Oct 2015	2	EMB REM	General review update to intubation medication
April 2016	3	Neonatal Guidelines Meeting Neonatal Governance Meeting	
Nov 2022	4	Neonatal Guidelines Meeting Neonatal Governance Meeting	Sucrose dose administration advice changed from weight ranges to gestation. Removed reuse of sucrose vial Removed 'consider ametop for venapuncture' Premedication for intubation fentanyl dose changed from 5 microgram/kg to 3-5 microgram Consider use of paracetamol added. Morphine dose amended from 30mcg-40mcg/kg to now 30mcg /kg only Format update