Clinical Guideline: Premedication for non-emergency endotracheal intubation in the neonate

Guideline no:	NEO-ODN-2016-1	
Clinical guideline:	**Premedication for non-emergency endotracheal intubation in the neonate**	
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Adapted/Modified from:	2005 EoE guideline on sedation and muscle relaxation for elective intubation by Dr Matthew James	
For use in:	Neonatal units in East of England (X 17)	
Used by:	Medical and nursing staff in neonatal units across EoE	
Key words:	Neonate, Endotracheal intubation, and premedication	
Approval date:	**Reveiewed at COG 6 September. Approved with minor changes.**	
Review date:	**January 2019 (or earlier in light of new evidence)**	
Approved by:	**COG members**	
Ratified by EoE ODN board	**January 2016**	
Audit standards:	**Standard**	**Expected compliance**
	Premedication use according to guideline during non-emergency intubation	**100 %**
	Contemporaneous documentation of procedure using standard label	**100 %**
	A competent practitioner (Registrar or ANNP or consultant) must be present during procedure	**100 %**

Introduction:

Endotracheal intubation is a common procedure performed in the neonate. This procedure causes pain and discomfort and frequently results in significant physiological disturbance i.e. hypoxia, bradycardia, systemic hypertension and raised ICP.[1] In preterm infants these physiological disturbances increase the risk of intraventricular haemorrhage. Evidence suggests that with premedications the procedure is quicker, easier and with less physiologic disturbance.[2] Moreover, reducing pain and discomfort has far reaching positive effects and pain relief is an ethical obligation for those providing care for these vulnerable newborns.

Aim/Goal of the guideline:

Provide evidence-based recommendations for use of a combination of medications prior to non-emergency (elective) endotracheal intubations in neonates.

To improve quality and success rate of intubations whilst reducing risks of trauma and physiological instability which has the potential to contribute to poor short/long term outcomes.

Areas outside the remit of this guideline:

These guidelines **DO NOT** apply to emergency intubation as part of resuscitation.

These guidelines **DO NOT** cover the practical aspects of the endotracheal intubation procedure.

Precautions:

Intravenous access, continuous heart rate and oxygen saturation monitoring are pre-requisites.

These guidelines assume the presence of one or more individuals competent in advanced airway skills.

Airway/breathing maneuvers should be applied as per NLS guidelines.

Use of end tidal CO2 monitoring devices such as Pedi Cap is recommended.[3]

Preparation:

1. At least two people (of whom one should be trained in neonatal resuscitation) should be involved in the procedure including a dedicated assistant not involved in any other aspect of the infant's care.
2. Follow the UK Resuscitation Guidelines to ensure infant is clinically stable during the period of preparation. Ensure all equipment is on hand – laryngoscope, appropriate ET tube sizes, suction catheter, tube fixation kit, Pedi cap CO2 detectors and stethoscope. Ensure the resuscitation equipment is working including the suction machine.
3. Establish IV access. Administer pre-medication **in the order of** Fentanyl or Remifentanil, Suxamethonium and Atropine as per doses in table 1.
4. Use a neonatal pain assessment tool (NIPS) during procedure.

Analgesia:

An ideal analgesic agent should have rapid onset and short duration of action with no or minimal adverse effect on respiratory mechanics, and predictable pharmacokinetic properties. None of the currently available medications fit this profile, however, opioids come closest to fulfilling these characteristics. Though morphine is the most commonly used drug for intubation, recently studies have challenged its use because of delayed onset of action and little effect on improving physiologic stability during intubation.[4,5] Fentanyl and Remifentanil are suitable alternatives because of their rapid onset and short duration of action.[6,7] There are some concerns regarding **chest wall rigidity** with synthetic opioid use – however this can be reversed by naloxone use or more appropriately minimized by **slow administration**, and **co-administration** of a rapid acting muscle relaxant.

Recommendation: Synthetic opioids (Fentanyl and Remifentanil) are superior to Morphine for analgesia during non-emergency intubation. Remifentanil, due to its rapid onset of action may be an acceptable or even superior alternative to Fentanyl.[8]

Sedation:

Sedatives such as benzodiazepines, barbiturates or propofol are not recommended for non-emergency intubation, particularly in the context of surfactant administration and extubation (InSurE) because of high incidence of respiratory depression and hypotension.[6,7]

Recommendation: Sedatives are **NOT** recommended as part of premedication for neonatal intubation.

Vagolytic agents:

These agents prevent bradycardia during intubation and decrease airway secretions. Atropine and Glycopyrrolate are effective vagolytic agents but no direct comparative studies have been performed in neonates. Due it's to wider use and familiarity most clinicians prefer atropine over glycopyrrolate.[6]

Recommendation: Atropine should be used as a vagolytic agent during neonatal intubation.

Muscle relaxants:

Muscle relaxation to facilitate intubation minimizes the rise in intracranial pressure that occurs during awake intubation. The ideal muscle relaxant should have rapid onset and short duration of action with minimal effects on heart rate and blood pressure. Succinylcholine (Suxamethonium Bromide) has been shown to result in faster intubation with less bradycardia and less trauma to oral/nasal passages.[9]

Recommendation: Suxamethonium is the preferred muscle relaxant for neonatal intubation.

Intubation for surfactant only (InSurE):

Surfactant replacement therapy is the most frequent indication for intubation in preterms. Current evidence supports Intubation, Surfactant administration and Extubation (InSurE) as preferred strategy as it decreases the need for mechanical ventilation, air leaks and later chronic lung disease. Rapid recovery of respiratory drive is essential for the success of InSurE technique which emphasizes the need for a shorter duration of action of medications used for premedication. **Remifentanil has clear theoretical advantages over other synthetic opioids because of its rapid onset and shorter duration of action.**[8]

TABLE 1: Drugs for premedication for non-emergency intubation
(Prefilled syringes (CIVAS) preferable)

Medication	Preparation	Dose	Administration	Onset, peak and duration of action	Side effect
FENTANYL (Controlled Drug)	50 micrograms/ml 2ml size Diluent: 0.9% sodium chloride or 5% dextrose	**2 micrograms/kg** (Range 1 – 4 micrograms/kg)[6] IV **slowly over 1-2 minutes** followed by a slow 0.9% sodium chloride flush Repeat dose of 3 micrograms/kg can be given if required	Draw 0.2mls (10micrograms) and dilute to 1ml with glucose 5% in a 1ml syringe = 10micrograms/ml , then give 0.1-0.4 mls for each Kg of baby's weight	Onset of action: IV- almost immediate Peak effect: 5-15 minutes Duration of analgesic effect: 30 – 60 minutes	Chest wall rigidity (can be reversed with naloxone or muscle relaxant), seizure-like activity, respiratory depression, bradycardia
OR					
REMIFENTANIL **(Controlled Drug)**	1 mg vial Diluent: 0.9% sodium chloride or 5% dextrose	**2 micrograms/kg** (Range 1 -3 micrograms/kg)[6] **IV slowly over 1-2 minutes** followed by a slow 0.9% sodium chloride flush Repeat dose of 3 micrograms/kg can be given if required	Draw 0.2mls (10micrograms) and dilute to 1ml with glucose 5% in a 1ml syringe =10micrograms/ml, then give 0.1-0.3 mls for each Kg of baby's weight	Onset of action: IV- immediate Peak effect: 1-2 minutes Duration of analgesic effect: 3-10 minutes	Apnoea, hypotension, chest wall rigidity, CNS depression
SUXAMETHONIUM (Muscle Relaxant)	50 mg/ml 2ml size **in fridge** 0.9% Sodium chloride or 5% dextrose	**2 mg/kg** stat IV bolus[6,7]	Draw 0.2ml (10mg) and dilute to 1ml with 5% dextrose in a 1ml syringe = 10 mg/ml then draw up 0.2ml (2 mg of diluted solution) for each Kg of baby's weight	Onset of action: 1-2 minutes Duration of action: 3-5 minutes	Bradycardia especially after second dose of suxamethonium, transient hyperkalemia, malignant hyperthermia
ATROPINE (Vagolytic)	600 micrograms/ml 1ml size Dilution not recommended	**20 micrograms/kg** stat IV bolus[6,7]	Draw up 0.03mls (20 micrograms) for each Kg of baby's weight	Onset of action: Immediate Peak effects: 12-16 min, Duration of action: 4-6 hrs	

Documentation:

Premedications must be prescribed and signed for appropriately. Documentation should include

- Indication for intubation
- Informed verbal consent from parent (if possible)
- Observations pre and post procedure
- Number of attempts, name of person (s) performing the procedure
- Adverse events during procedure
- Endotracheal tube size, level at which secured
- Methods used to identify correct tube placement (Chest movements, air entry, Pedi Cap etc.)
- Position of endotracheal tube on CXR

References:

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6. Kumar P, Denson S, Mancuso TJ. Clinical report-Premedication for nonemergency endotracheal intubation in the neonate. Pediatrics 2010; 125(3): 608-15.
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(The appendix on the next page can be printed on Avery L7169 labels or equivalent)

Intubation

Date: ..... Time: .....

Indication: .....

Premedication: ETT Diameter: .....

1. ..... Nasal/Oral: .....

2. .....

3. ..... ETT Length: .....

Procedure carried out by:

Name	Grade	No. attempts
1.	.....	.....
2.	.....	.....

Tolerated procedure Yes ☐ No ☐ (give details)

.....

.....

Signature .....

Intubation

Date: ..... Time: .....

Indication: .....

Premedication: ETT Diameter: .....

1. ..... Nasal/Oral: .....

2. .....

3. ..... ETT Length: .....

Procedure carried out by:

Name	Grade	No. attempts
1.	.....	.....
2.	.....	.....

Tolerated procedure Yes ☐ No ☐ (give details)

.....

.....

Signature .....

Intubation

Date: ..... Time: .....

Indication: .....

Premedication: ETT Diameter: .....

1. ..... Nasal/Oral: .....

2. .....

3. ..... ETT Length: .....

Procedure carried out by:

Name	Grade	No. attempts
1.	.....	.....
2.	.....	.....

Tolerated procedure Yes ☐ No ☐ (give details)

.....

.....

Signature .....

Intubation

Date: ..... Time: .....

Indication: .....

Premedication: ETT Diameter: .....

1. ..... Nasal/Oral: .....

2. .....

3. ..... ETT Length: .....

Procedure carried out by:

Name	Grade	No. attempts
1.	.....	.....
2.	.....	.....

Tolerated procedure Yes ☐ No ☐ (give details)

.....

.....

Signature .....

Exceptional Circumstances Form

Form to be completed in the **exceptional** circumstances that the Trust is not able to follow ODN approved guidelines.

Details of person completing the form:	
Title:	Organisation:
First name:	Email contact address:
Surname:	Telephone contact number:
Title of document to be excepted from:	
Rationale why Trust is unable to adhere to the document:	
Signature of speciality Clinical Lead: Date:	Signature of Trust Nursing / Medical Director: Date:
Hard Copy Received by ODN (date and sign):	Date acknowledgement receipt sent out:

Please email form to: mandybaker6@nhs.net requesting receipt.

Send hard signed copy to: Mandy Baker
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