Premedication for Neonatal Intubation UHL Neonatal Guideline

University Hospitals of Leicester NHS Trust

C13/2007

Contents

1. Scope& background

This guideline is aimed at all Health care professionals involved in the care of infants within the Neonatal Service.
This guideline is intended to provide guidance for the safe and effective use of premedication drugs when intubating patients on the neonatal units at Leicester General Hospital and Leicester Royal Infirmary.
The use of analgesia/sedation and paralysis prior to intubation is intended to minimise the following (see references, grade B evidence):

- Pain and discomfort
- Time taken for intubation and number of intubation attempts.
- Incidence of airway trauma.
- Adverse cardiovascular reactions.
- Intubation-associated rises in intracranial pressure.

Applicable patients:
The use of premedication should be limited to babies who meet the following criteria:

1. **Being cared for on the neonatal unit:** Intubations on labour ward or during transport are not suitable as they are performed in more difficult circumstances, often as an emergency when time is of the essence.

2. **Relatively stable condition:** If a baby cannot be maintained by bag / mask or NeoPuff ventilation whilst drugs are drawn up, or is otherwise very unstable, the use of premedication agents is inappropriate. Attending medical staff must decide whether a baby falls into this category. It is estimated that 10% of babies intubated on a neonatal unit may be in this group.

Related UHL documents:

- Difficult Airway UHL Neonatal Guideline C5/2014
- Resuscitation at Birth UHL Neonatal Guideline B35/2008
- Neonatal Drug Monographs - BadgerNet

Table 1: Drug regime

Fentanyl + Suxamethonium +/- atropine are recommended:

Fentanyl **5 microgram / kg** **IV**	Give once prior to intubation Infusion as a slow bolus over 3-5 minutes Consider using 3 microgram/kg if baby has hypoplastic left heart syndrome or other complex congenital heart disease Have naloxone, suxamethonium, atropine available Be aware that too rapid infusion of fentanyl can be associated with chest wall rigidity
Suxamethonium **2 mg / Kg** **IV**	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. A 2nd suxamethonium dose can be given if necessary.
Atropine **20 microgram /Kg** **IV**	Only to be used if clinically indicated to reverse intubation induced bradycardia. Dose can be repeated if necessary.

2. Practice Guidelines:

The following practice guidelines should be followed when using premedication for intubation. They are intended to help ensure safe, consistent and effective practice.

1. On admission to Neonatal ITU, all infants should have their premedication for intubation drugs prescribed on the front of the drug chart for future use (appendix 2). This allows rapid and accurate preparation of premedication drugs if required. **This prescription should be updated and rewritten every time a new drug chart is required.**

2. When intubation is required assess degree of urgency. Infants requiring emergency ('crash') intubation are NOT suitable for premedication.

3. **If you think an intubated baby's endotracheal tube (ETT) is blocked then remove it and establish effective NeoPuff or bag / mask ventilation before considering whether premedication is appropriate or not for reintubation.**

4. Draw up pre-med drugs as follows:

Table 2:Drug doseages

Fentanyl 10micrograms / ml ampoule	**0.5 ml / kg rounded down to the nearest 0.1ml from prefilled syringe = 5 microgram / kg** Use 0.3ml / kg if using reduced dose in babies with complex cardiac conditions
Suxamethonium 5mg / ml pre-filled syringe	0.4 ml / kg = 2 mg/kg dose round down to the nearest 0.1ml Have suxamethonium drawn up before fentanyl is given
Atropine 600 microgram / ml ampoule	– Draw up 1ml and add to 3mls water for injection to give 150microgram/ml solution. – Draw up 0.13ml (20 micrograms) per kg.
Draw up 0.9% sodium chloride	– To be used as flush between each premed drug.

5. **Whilst drawing up drugs and preparing equipment, an allocated person MUST ensure the airway is maintained and adequate ventilation / oxygenation occurs (aim to keep saturations >90%**).

6. Use intubation checklist throughout intubation

7. Get intubation equipment ready in advance, including appropriate ETT clamp.

8. Ensure patent IV cannula using 0.9% sodium chloride flush (0.5-1.0ml).

9. Optimise patient position for intubation including height of the incubator.

10. Give fentanyl bolus as a slow push over a 3-5 minutes IV, followed by 0.9% saline flush; allow ~ 3 minutes for Fentanyl to take effect.

11. Give suxamethonium bolus followed by 0.9% sodium chloride flush.

12. Once infant is muscle relaxed (usually within 30 seconds of giving suxamethonium) orally intubate with appropriate ETT.

13. Ensure adequate ventilation with ETT is possible; colour change capnography should be used to confirm ETT is correctly sited. Once happy with ETT position then secure the ETT and reconfirm bilateral air entry.

14. Note length of ETT at lips for the records as well as the size of the ETT.

15. Throughout procedure infant heart rate and saturations should be monitored.

16. Stylets could be useful to assist in intubation but avoid positioning the tip to the end of the ET tube.

17. Have atropine available and if infant develops sinus bradycardia give as a bolus followed by 0.9% sodium chloride flush.

18. A post-intubation chest X-Ray to check ETT position will usually be required, plus check blood gas within 30 minutes of intubation.

19. Procedure to be documented in clinical notes including ETT length, any subsequent ETT adjustments and conformation of bilateral air entry.

20. Complete intubation audit form if appropriate.

2.1 Chest wall rigidity with fentanyl

This is a rare side effect of fentanyl. It should be managed with suxamethonium and if necessary naloxone to reverse the effects of fentanyl. Increase FiO_2 to maintain oxygenation, adjust airway positioning & pressures to facilitate chest wall movement. Call for senior help early if there are difficulties with getting the chest to rise adequately.

2.2 Who should intubate?

Intubation should be carried out by a person who has experience in intubating babies or by a more junior member of staff in a controlled manner, supervised by a more senior member of staff who has experience of intubation.

Generally intubation of babies <26 weeks should be by experienced staff. Occasionally babies with known difficult airways are intubated in theatre by Neonatologists and / or paediatric anaesthetists with ENT cover (Difficult Airway UHL Neonatal Guideline)

2.3 If a baby is already on a morphine infusion

This is a clinical decision – assess how active the baby is. Is further sedation needed? If it is, then use fentanyl as above.

2.4 Difficult intubations

In the event of a difficult intubation the priority is to maintain oxygen saturations & heart rate and seek senior help as quickly as possible. There is a difficult intubation box on the intubation trolley in ITU B.

Properly delivered bag / mask ventilation or NeoPuff / mask ventilation (ensure appropriate pressure & oxygen delivery) should ensure adequate oxygenation. Consider inserting a size 1 i-gel laryngeal mask if airway management is difficult.

Sources of help include Neonatal Consultants, other neonatal registrars and paediatric anaesthetic consultants.

Successful intubation can be facilitated by:

- Correct positioning of the baby
- Using an appropriate sized laryngoscope blade
- Adequate clearance of secretions
- Appropriate sedation
- Lifting the laryngoscope blade forwards & upwards rather than levering backwards
- A calm approach
- Using a video laryngoscope (consultant should be involved if this is being used)

3. Education & training

None

4. References

- Chaudhary et al. Use of premedication for intubation in tertiary neonatal units in the United Kingdom. Paediatr Anaesth 2009 Jul; 19(7):653-8. Epub 2009 May 15.

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5. Evidence Criteria

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

6. Audit standards

- All babies in ITU / HDU should have intubation drugs prescribed on the front sheet of their current drug chart (100%). See appendix 1.
- All intubations should be documented in the medical records (100%).

7. Key Words

Clavicle, Erb's palsy, Horner's syndrome, Palsy, Toronto scale

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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: J Fawke - Consultant** **Reviewer: Neonatal guidelines group** Contact – S Mittal- Consultant - clinical guidelines lead	**Executive Lead** Chief Medical Officer

Details of Changes made during review:

Date	Issue Number	Reviewed By	Description Of Changes (If Any)
Dec 2004	**1**		Original guideline
April 2011	**2**	Neonatal Guidelines Meeting	
Oct 2015	**3**	Author JAF Guidelines lead – REM Neonatal Guidelines Meeting Neonatal Governance Meeting	General review & amendments to medication used Amendments and Flowchart added
Nov 2018	**4**	Governance Meeting	Guideline review and update
April 2022	**5**	Governance Meeting	Merged endotracheal tube management guideline (C37/2015) with Intubation guideline. Expanded the gestational age from 23-42 weeks to 22-42 weeks in the ET tube placement guide. Added to point 13- once happy with ETT position then secure the ETT and reconfirm bilateral air entry. Added point 16 - Stylets could be useful to assist in intubation but avoid positioning the tip to the end of the ET tube. Added - Consider inserting a size 1 i-gel laryngeal mask if airway management is difficult

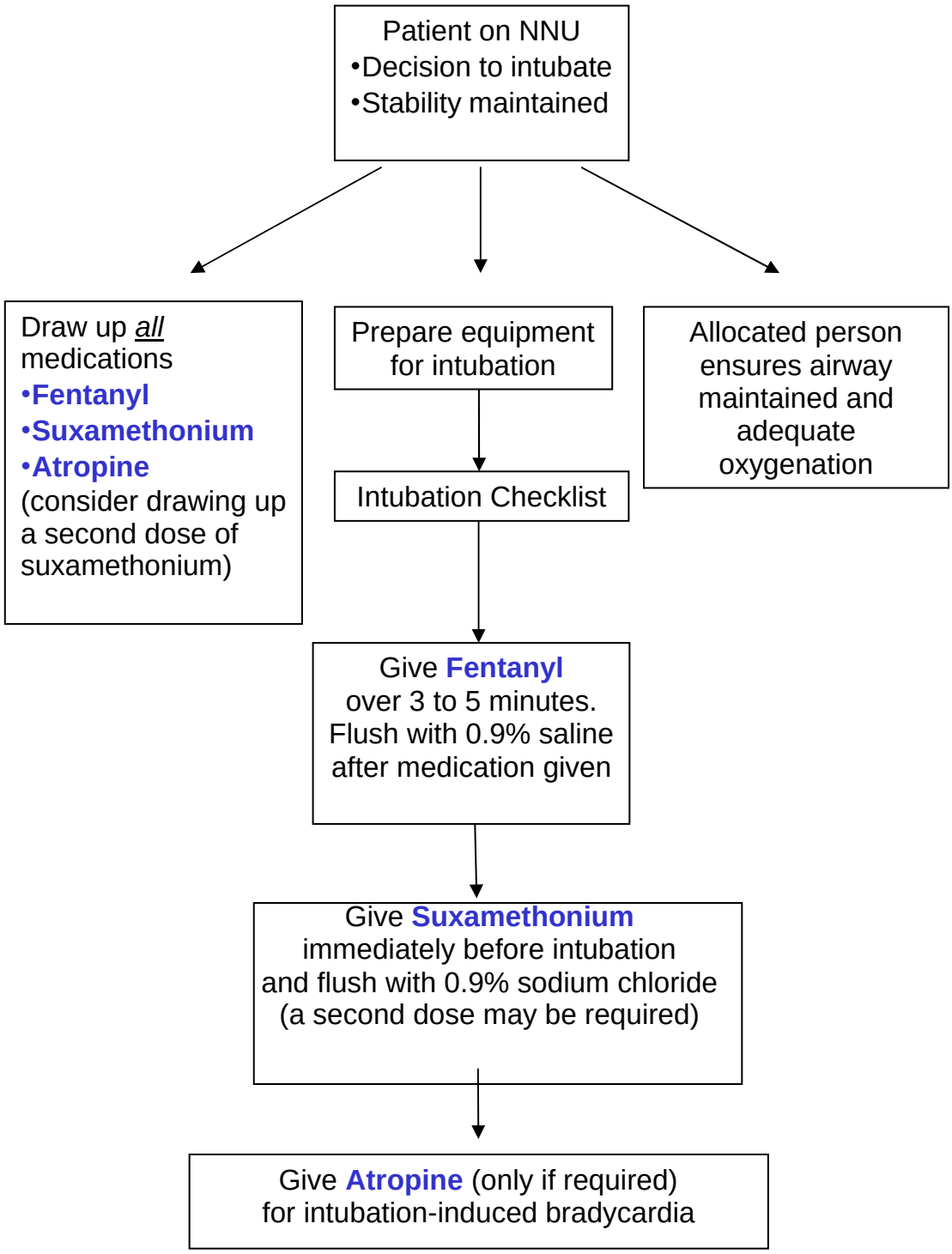
Appendix 1: Intubation drugs section of NNU prescription chart

INTUBATION DRUGS (IF REQUIRED)

Sign against required weight band and cross through other dose bands

Weight band	Drug	Route	Dose	Signature/ Print name	Date	Date given	Time given	Given by	Checked by
0.4-0.599 kg	Fentanyl	IV	3 micrograms = 0.3 ml						
	Suxamethonium	IV	1 mg = 0.2 ml						
	Atropine	IV	9 micrograms						
0.6-0.799 kg	Fentanyl	IV	4 micrograms = 0.4 ml						
	Suxamethonium	IV	1.5mg = 0.3 ml						
	Atropine	IV	12 micrograms						
0.8-0.999 kg	Fentanyl	IV	5 micrograms = 0.5 ml						
	Suxamethonium	IV	2 mg = 0.4 ml						
	Atropine	IV	15 micrograms						
1 kg or more	Fentanyl (10 microgram/ml)	IV	5 microgram/kg = 0.5 ml/kg dose =						
	Suxamethonium (5 mg/ml)	IV	2 mg/kg = 0.4 ml/kg dose =						
	Atropine	IV	20 micrograms/kg dose =						

Appendix 2: Flow chart: intubation with medication



Appendix 3: Guide for placement of Endotracheal Tubes

The following chart is intended to serve **as a guide** for placement of ETT tubes in newborn babies. Suggested tube sizes and lengths are based on the 50th centile weight for the given gestational age.

Please remember that adjustments will need to be made for babies that are significantly larger or smaller than expected.

50th Centile weight by gestation		Tube diameter and length at the lip	
Gestation (weeks)	**Body wt (kg)**	**Diameter (mm)**	**Length at the lip (cm)**
22-23	**0.5**	**2.5**	**5.5**
24-26	**0.75**	**2.5**	**6.0**
27	**1.0**	**2.5**	**6.5**
30	**1.5**	**2.5 – 3.0**	**7.0**
33	**2.0**	**2.5 – 3.0**	**7.5**
35	**2.5**	**3.0**	**8.0**
37	**3.0**	**3.0 – 3.5**	**8.5**
40	**3.5**	**3.5**	**9.0**
42	**4.0**	**3.5 – 4.0**	**9.5**

Adapted from: Kempley ST, Moreiras JW, Petrone FL. Endotracheal tube length for neonatal intubation. Resuscitation 2008; 77:369.

In addition, the black line found at the tip of the ET tube is a mark to guide the optimum depth of placement of the ET tube. The end of this black line should usually be placed at the level of the vocal cords.

Appendix 4: Neonatal Pre-Intubation Checklist

(modified after Alice Kavati / Mark Ainsworth / Jonathan Cusack)

Name:

Date of Birth:

S Number:

Affix label if available

Pre-intubation Checklist

Please complete the checklist before every intubation and file in the baby's notes at the end of the procedure

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1 Confirm

- ☐ Correct baby
- ☐ Indication for Intubation
- ☐ Parents aware / consent

2 Prepare Equipment

- ☐ Working laryngoscope
- ☐ Spare laryngoscope
- ☐ Tracheal tube
- ☐ Stylet (check tip)
- ☐ Suction
- ☐ ET securing device
- ☐ Hat with ties
- ☐ Confirm drug doses
- ☐ Check mask size
- ☐ Read out neopuff settings

3 Final Safety Check

- ☐ Does everyone know each other's name?
- ☐ Confirm roles and where to stand
- ☐ Position the baby
- ☐ Confirm monitoring is in place
- ☐ Anticipated difficult intubation?
- ☐ Verbalise plan if intubation fails

4 Proceed with Intubation

- ☐ Confirm ET tube size and position at lips
- ☐ Confirm auscultation & CO_2 detection
- ☐ Confirm SaO_2 reading & heart rate
- ☐ Confirm ET tube fixed securely

Intubated by

No. of attempts

Size of tube

Position at lips

Position on x-ray/ action taken

Any complications?

If at any time you are concerned that the intubation should not go ahead, please state **'Stop the procedure'** to the team leader

Signed:

Print Name:

Date: Time: