

The Difficult Neonatal Intubation

Date of Implementation:	June 2012
Version:	Version 1
Date of Next Review:	June 2014
Lead Neonatal Consultant :	T Pillay
Policy Location:	Neonatal Guidelines - Trust Intranet

Background Information:

In most babies direct laryngoscopy results in a clear view of the larynx. The laryngeal view has been classified by Cormack and Lehane as follows:



Grade 1: visualization of the entire laryngeal aperture. There should be no difficulty in intubation.

Grade 2: visualization of just the posterior portion of the laryngeal aperture. There may be slight difficulty. Cricoid pressure will improve visualisation.

Grade 3: visualization of only the epiglottis. This can result in severe difficulty; cricoid pressure may be helpful.

Grade 4: visualization of just the soft palate only, not even the epiglottis is visible. This is always difficult and usually accompanies obvious pathology but may also occur totally unexpectedly. This must have senior support available.

Management plan:

A. Difficulties with neonatal intubation may occur at or after delivery.

These may be

- a) **Anticipated** (eg. syndromes such as Pierre Robin Sequence, Treacher –Collins, cleft lip and palate, Goldenhar syndrome, Apert /Crouzon Syndrome, Down Syndrome)
or
- b) **Unanticipated** (eg subglottic stenosis, laryngeal atresia, laryngeal or tracheal webs, glottic oedema post extubation)

- Always call for help early.
- For all situations where difficulty in intubation is anticipated, ensure senior help is at hand before commencing. This can be in the form of a senior experienced middle grade, consultant, or ENT consultant (if indicated eg for severe Pierre Robin sequence).
- For anticipated and unanticipated difficulties with intubation, follow intubation drill below.

The Royal Wolverhampton Hospitals NHS Trust

Intubation Drill

B. Prevention/minimising the risks is key and should include the following :

B1. Plan and Prepare

a) Plan airway support for impending emergency

Emergency trolley/bag must be checked at the start of every shift and this must be documented:

Trolley should contain

Size 2.5, 3.0 and 3.5 ETT, and stylets

Size 2.0 ETT to be kept in fridge to maintain rigidity until needed.

Round soft silicone Laerdal Face masks for the extreme preterm, preterm and term baby (sizes 00, 0/1, 2)

Straight and curved blade laryngoscopes

Neonatal bag valve mask (as Back-up)

Guedel oral airways (size 000, 00, and 0)

When these become available to the unit:

- Laryngeal mask airway, smallest size (size 1), for the term baby
- Videolaryngoscope,

All Other requirements are as described in guideline on Neonatal Resuscitation Trolley

Check list must be adhered to and the neonatal ward manager should nominate a member of staff to achieve this. Doctors' portable emergency equipment bag must be checked daily and signed against.

b) Prepare equipment for the intubation

Confirm that the correct size ETTs, stylets, functioning laryngoscopes, masks are available.

Confirm wall oxygen, tom-thumb T-piece circuit, and suction system ready and working.

Connect baby to monitors: cardiac, pulse oximetry, blood pressure.

Prepare ventilator in anticipation.

*b) Plan the drugs you will use for the patient and their sequence for **controlled intubations.***

Write this up for nurses to prepare.

Ask Nursing team leader to redirect additional nurse(s) to assist.

d) Ensure baby *has venous access* before attempting intubation for controlled intubations, – this can be through peripheral line, percutaneous long line or umbilical venous catheter. For unanticipated intubations (emergency), establishing a clear/secure airway and ventilation take precedence.

The Royal Wolverhampton Hospitals NHS Trust

B2. Position the baby for optimal ventilation/intubation

Keep baby warm; expose only as indicated to see chest wall excursion
Use thermal control aids as available eg transwarmer, bubble wrap, incubator, resuscitaire overhead heater
Incubator/resuscitaire should be at a comfortable height
Empty baby's tummy using Nasogastric or orogastric tube attached to a syringe
Keep head in neutral position (overextension will decrease visibility); use jaw thrust if needed.
A small towel roll under the neck may be help to improve your view of the larynx.
Primary nurse assisting should ensure baby is securely held/positioned for the procedure.
Use Guedel airway to keep airway open.

B3. Preoxygenate: bag valve mask or Tom-thumb T piece system, except where congenital diaphragmatic hernia is suspected. *Always ensure ability to bag/mask ventilate before administering iv sedation or paralytic drugs*

B4. Premedicate: if controlled intubation. Use fentanyl, atropine and suxamethonium as per premedication guidelines. For emergency intubations this might not be possible.

B5. Pass the ETT, and confirm position to exclude inadvertent oesophageal intubation.

This can be done by assessing :

- Equal right and left chest excursions on bag ventilation
- Equal air entry on auscultation – both sides of chest wall anteriorly and axillae to exclude inadvertent right or left main bronchus intubation (could be either at this age)
- Auscultation over the epigastrium – to exclude oesophageal intubation

- Improvement in oxygen saturations, heart rate and peripheral colour
- End tidal CO2 monitoring, if available
- Chest Xray –check that the tip of the tube is between or at the level of the clavicular heads.

B6. Prevent/anticipate difficulty in intubation/re-intubation:

- For ventilated babies due for extubation, you can reduce the risks of a difficult re-intubation, by considering *pre-extubation dexamethasone* to reduce cord oedema. This is especially in babies who have had difficult initial intubations or a chronic ventilatory course.
- Consider dexamethasone if ETT leak on ventilator does not exceed 10-15%.

The Royal Wolverhampton Hospitals NHS Trust

C. Dealing with common problems:

Oesophageal intubation:	Blade placed too deep, cords not visualised. Retry with shallow blade insertion and use cricoid pressure
Tongue obscures vision:	Sweep tongue to the left side using blade Use a more anterior lift Try a straight blade if you have not done so already Use tape on blade to prevent it slipping off – (NB - may obscure your view further if not done right)
Cannot see the cords:	head may be hyper-extended-reposition and retry. Try a small towel roll under the neck.
Cannot intubate:	Don't panic. Calmly maintain chest excursions through bag or T-piece/ mask ventilation until help arrives. Use guedel oral airway if needed.

D. Failed intubation drill

- **Call for senior help as appropriate**
Remember chest excursion is what is needed. Baby will survive on mask ventilation with adequate chest excursion, but will not survive repeated unsuccessful ETT attempts!
 - Between 9am-10pm call your consultant for immediate support. Your consultant is on site and will respond immediately
 - Between 10pm and 9am at night call for support as follows:
 - Paediatric Registrar support from Paediatric wards
 - Consultant as back up as it will take a short period of time before consultant can be physically present at bedside
 - Your consultant will be giving a member of your team 'blue toothed telephonic advice' while rushing in to support you
 - Consider asking for anaesthetic (O/G) support
- Maintain neutral head position
- Use jaw thrust
- Release cricoid pressure initially (withdraw if chest excursion is better without)
- Maintain Bag/mask ventilation or T-piece/mask ventilation
- Use Guedel oral airway to augment patency of upper airway
- Get nurse to empty stomach with naso or orogastric tube and syringe. Aspirate pharynx gently as required.
- Keep baby warm

The Royal Wolverhampton Hospitals NHS Trust

- **Additional Senior support can be provided as follows**

- **Blind intubation:** in the small baby where visualisation is poor due to size of baby
- **Laryngeal mask airway:** (size 1) for the term baby (if available and trained)
- **Videolaryngoscope:** if available to guide intubation through the cords
- **Railroad technique:** If laryngeal aperture is narrow, consider insertion of stylet through cords, and railroading* ETT over it
- **[Ultrasml fiberoptic bronchoscopy:** with railroading via bronchoscope. This is not available at NXH
- **Surgical tracheostomy:** is not undertaken by neonatal consultants; will need ENT support]
- **Additional dose of suxamethonium can be used in the case of prolonged procedure.** This should be under senior guidance.

While waiting for senior help and on bag/mask or T-piece/mask ventilation, get assistant to check vital signs and insure the following are in place

- Insert umbilical catheter/peripheral line for venous access, if this was an emergency intubation and baby does not have access. Competent assistant will need to maintain bag/mask or T-piece ventilation.
- Support cardiac system with IV Fluid boluses as needed
- Use inotropic agents as needed based on perfusion and blood pressure.

*** ETT railroading:**

- insert a straight stylet/bougie through vocal cords carefully, not more than 2cm beyond aperture opening.
- keep stylet/bougie steady while colleague threads ETT over top end of stylet and into trachea
- this is usually a two person procedure and can be done under direct vision or blind, depending on visual field and equipment