

## Trust Guideline for the Management of: A Neonate with Difficult Airway

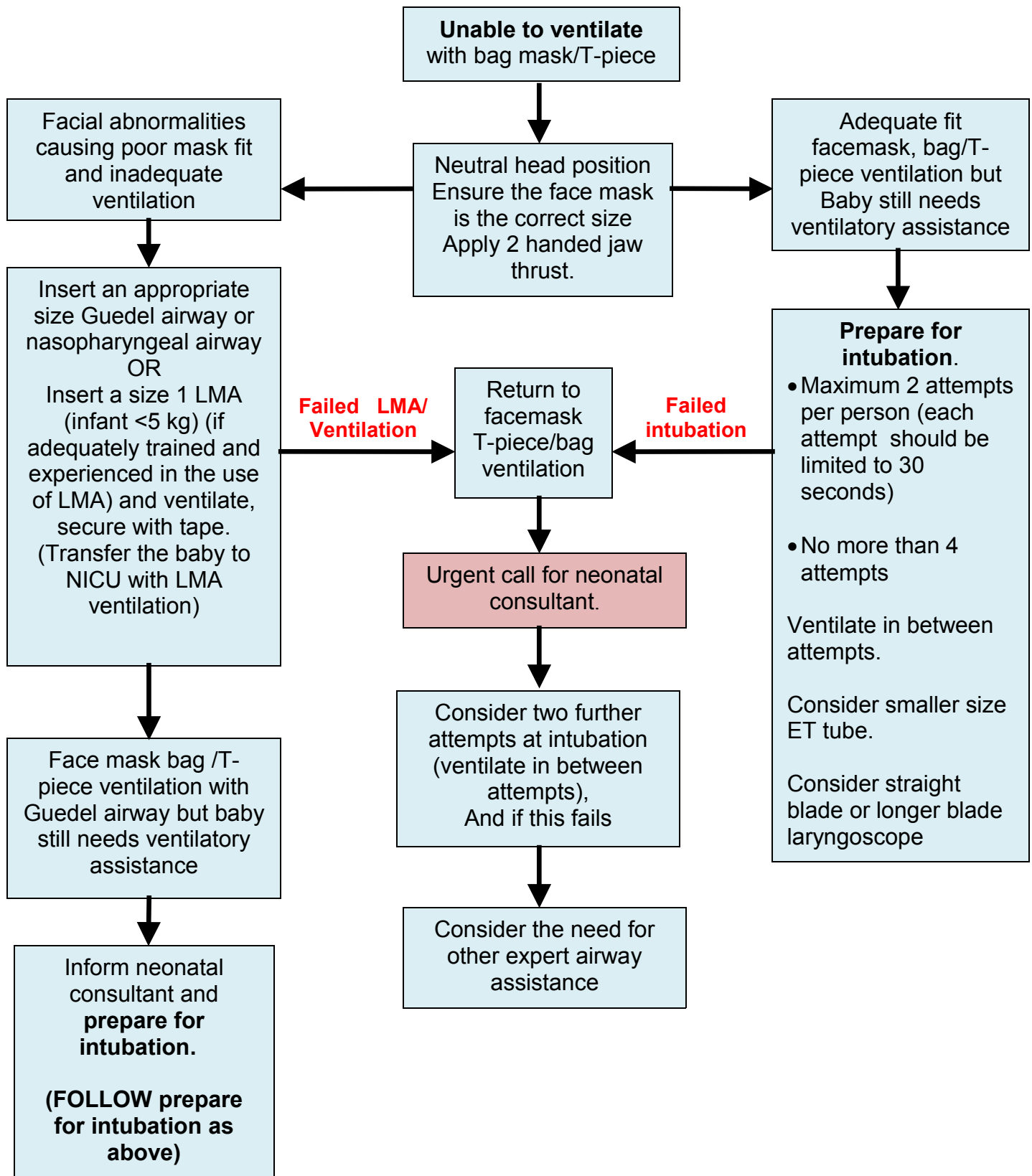
<b>For Use in:</b>	Neonatal unit, Delivery Suite, Obstetric theatres, CAU and any clinical area where neonatal resuscitation is required.
<b>By:</b>	Neonatologists, Anaesthetists
<b>For:</b>	Neonates
<b>Division responsible for document:</b>	Women and Children's Services
<b>Key words:</b>	Newborn, difficult airway.
<b>Name and job titles of document author:</b>	Dr. P. Muthukumar, Consultant Neonatologist Dr. A. Mauro, Consultant Paediatric Anaesthetist
<b>Name and job title of document author's Line Manager:</b>	David Booth, Chief of Women's and Children's Services
<b>Supported by:</b>	Neonatal consultants, Dr J Payne, Clinical Lead for paediatric Anaesthesia
<b>Assessed and approved by the:</b>	Clinical Guidelines and Assessment Panel (CGAP) If approved by committee or Governance Lead Chair's Action; tick here ✓
<b>Date of approval:</b>	28/03/2017
<b>Ratified by or reported as approved to (if applicable):</b>	Clinical Standards Group and Effectiveness Sub-Board
<b>To be reviewed before:</b> This document remains current after this date but will be under review	28/03/2020
<b>To be reviewed by:</b>	Dr Muthukumar
<b>Reference and / or Trust Docs ID No:</b>	10345 - CA5157
<b>Version No:</b>	3
<b>Description of changes:</b>	No clinical changes
<b>Compliance links: (is there any NICE related to guidance)</b>	None
<b>If Yes - does the strategy/policy deviate from the recommendations of NICE? If so why?</b>	N/A

This guideline has been approved by the Trust's Clinical Guidelines Assessment Panel as an aid to the diagnosis and management of relevant patients and clinical circumstances. Not every patient or situation fits neatly into a standard guideline scenario and the guideline must be interpreted and applied in practice in the light of prevailing clinical circumstances, the diagnostic and treatment options available and the professional judgement, knowledge and expertise of relevant clinicians. It is advised that the rationale for any departure from relevant guidance should be documented in the patient's case notes.

The Trust's guidelines are made publicly available as part of the collective endeavour to continuously improve the quality of healthcare through sharing medical experience and knowledge. The Trust accepts no responsibility for any misunderstanding or misapplication of this document.

# Trust Guideline for the Management of: A Neonate with Difficult Airway

Quick reference guideline: Figure 1



# Trust Guideline for the Management of: A Neonate with Difficult Airway

## Objective/s

To improve neonatal airway management.

## Rationale

Fewer than 5 – 10% of all babies will require assisted ventilation at birth. Ineffective ventilatory support leads to hypoxia and may result in increased morbidity and mortality.

Training in airway management tends to be opportunistic and the Individual experience of paediatric trainees is often variable. If the infant has a craniofacial abnormality, management of the airway may become even more difficult and challenging.

Currently there is no standard UK protocol for the management of a difficult neonatal airway and although rare, the ‘can’t ventilate adequately, can’t intubate’ scenario is life threatening. Morbidity and mortality is associated with repeated intubation attempts when airway oedema can result in a “can’t ventilate, can’t intubate” scenario. This guideline provides a structure for preparation and management of a neonate with difficult airway

## Broad recommendations

This guideline has been proposed after discussion with the paediatric anaesthetic team and largely adapted from the South West Midlands Newborn network proposal <sup>1</sup>.

Difficulties with neonatal intubation may occur at or after delivery.

These may be:-

### a) Anticipated in conditions like

- Achondroplasia
- Beckwith Wiedemann syndrome
- Cleft palate
- Craniofacial dysostosis: Apert, Crouzon and Pfeiffer’s syndromes
- Cystic hygroma
- Down’s syndrome
- Fibrodysplasia ossificans progressiva
- Freeman-Sheldon syndrome
- Goldenhar syndrome
- Hemi facial microsomia
- Klippel-Feil anomaly
- Mandibulofacial dysostosis
- Mucopolysaccharidoses
- Pierre Robin sequence
- Rubenstein-Taybe syndrome
- Treacher-Collins syndrome

## **Trust Guideline for the Management of: A Neonate with Difficult Airway**

### **b) Unanticipated in**

- Subglottic stenosis
- Laryngeal atresia
- Laryngeal or tracheal webs
- Glottic oedema post extubation
- Laryngeal cysts
- Vascular malformations: Haemangioma / arteriovenous malformations involving the face or airway
- Venous/ lymphatic malformation

### **Preparation for difficult airway management**

**An easy to access, well-maintained airway trolley is integral to the successful delivery of expert neonatal airway management.**

The following equipments should be stocked in the airway trolley (all stored in the airway trolley situated in room 1 in NICU except LMA (to be used only by staff who are adequately trained and experienced in its use) which is stored in the Obstetric Adult difficult airway trolley (drawer 5) just outside theatres in delivery suite.

- Endotracheal tubes (ETTs) ranging from size 2-4.5mm
- Miller laryngoscope and blades (both straight and curved)
- ETT Introducers/ stylet/bougie
- Endotracheal tube fixation equipment
- Round soft silicone Laerdal Face masks for the extreme preterm, preterm and term baby (sizes 00, 0,1, 2)
- Infant oropharyngeal airways (size 000, 00, and 0)
- Infant nasopharyngeal airways
- Infant laryngeal mask airways (LMA) (size 1)

### **Management plan**

**Prevention / minimising risk is the key. Always call for help early.**

**For all situations where difficulty in intubation is anticipated, ensure senior help is at hand before commencing.**

- If diagnosis is made in sufficient time antenatally, a MDT consultation, involving Neonatologist, Obstetrician, Anaesthetist, ENT surgeon should occur and a clear plan for airway management should be made.
- If possible, ask the obstetricians to aim for delivery during regular hours.
- During hours when NICU consultants are resident i.e. 9:00 AM to 9:30 PM, inform the consultant prior to attending the delivery.

During other times, attempts at intubation should be made by the most experienced person in the first instance. If unsuccessful, the neonatal consultant on call should be called urgently. If the neonatal consultant is already on site and if advanced airway is deemed necessary, then the neonatal consultant could consider asking for expert assistance from paediatric anaesthetist/ENT surgeon through the switchboard.

# Trust Guideline for the Management of: A Neonate with Difficult Airway

## Establishing a difficult airway algorithm

The proposed algorithm is illustrated in figure 1.

### Can't ventilate, can't intubate

If on initial assessment the infant is apnoeic or has inadequate respiratory effort, then the resuscitator must attempt to deliver positive pressure ventilation.

- The infant's head should be placed into the neutral position.
- A correctly sized facemask should be positioned, encircling the infant's mouth and nose and inflation breaths should be delivered using the T-piece.
- If there is difficulty creating a tight seal on the face-mask, a two-handed jaw thrust should be applied with the help of a second healthcare professional.
- If facemask T-piece ventilation remains inadequate, an airway adjunct should be used with either appropriately sized oropharyngeal airway (Guedel Airway) particularly in babies with Down's syndrome or nasopharyngeal airway may be used to relieve upper airway obstruction in infants with Pierre-Robin sequence, craniofacial anomalies and micrognathia.

**Nasopharyngeal airways** are not commercially available; if not, a shortened Endotracheal tube (ETT) may be used. The required nasopharyngeal airway length can be estimated from the distance between the nasal tip and the tragus of the ear.

- If the resuscitator is still unable to oxygenate the infant, as seen by poor chest movement, cyanosis or bradycardia **they must call for the help of neonatal consultant**
- At this stage, a supraglottic airway (LMA) may be used for airway rescue if bag and mask ventilation has failed. It is an effective modality for ventilation and studies have shown laryngeal mask airways (LMAs) to be quick and easy to insert<sup>2, 3,4,5</sup>
- If LMA insertion is successful, the infant should be ventilated through the LMA and transferred to the neonatal unit for intubation by a senior neonatologist.
- If LMA insertion is unsuccessful the resuscitation team should prepare for intubation.
- If direct laryngoscope proves difficult it is important to limit the number of attempts made in order to reduce the risk of upper airway trauma, oedema and bleeding. Therefore it is suggested that, in line with the difficult airway society's paediatric guideline<sup>6</sup>, each person should have a maximum of two attempts at intubation and no more than four attempts should be made in total.

If intubation is successful the infant should be transferred to the neonatal unit for further stabilisation. Where direct laryngoscope has failed, assistance of anaesthetist and ENT surgeon should be sought as per algorithm in figure1.

### Can ventilate can't intubate

If on initial assessment, facemask T-piece ventilation is effective, as demonstrated by good chest expansion and a rising heart rate, but the infant still needs assistance, then the resuscitator should prepare for intubation.

## Trust Guideline for the Management of: A Neonate with Difficult Airway

- Each intubation attempt should be limited to 30 seconds to minimise the risk of hypoxia.
- If the intubation attempt is unsuccessful then the resuscitator should return to facemask T-piece ventilation to optimise oxygenation. Each person should have a maximum of two attempts at intubation, with no more than four attempts being made in total.
- If intubation is unsuccessful consider inserting an LMA as a rescue device and ventilating through the device.
- Where both direct laryngoscope and LMA has failed, assistance of anaesthetist and ENT surgeon might be helpful and could be considered. This discussion should be initiated by the neonatal consultant while waiting for senior help and stable on bag/mask or T-piece ventilation ,
- Attach the baby to pulse oximetry if not already done and insert umbilical catheter/peripheral line for venous access.

### Clinical audit standards

Difficult airway incidents to be audited regularly

### Summary of development and consultation process undertaken before registration and dissemination

The authors drafted the guideline on behalf of the Neonatal Intensive Care Team and the Paediatric Anaesthetic team. It has been discussed in the neonatal guidelines meeting, Paediatric Anaesthetists meeting and circulated to the attention of Jenny Lind Children's Hospital (JLCH) governance committee.

### Distribution list/ dissemination method

Trust intranet

### References/ source documents

1. **Johansen L.C., Mupanemunda R.H., Danha R.F.** Managing the newborn infant with a difficult airway. *Infant* 2012; 8(4): 116-19
2. **Grein AJ, Weiner GM** [Laryngeal mask airway versus bag-mask ventilation or endotracheal intubation for neonatal resuscitation.](#) *Cochrane Database Syst Rev.* 2005 Apr ;(2):CD003314.
3. **Gandini D., Brimacombe J.R.** Neonatal resuscitation with the laryngeal mask airway in normal and low birth weight infants. *Anaesth Analg* 1999; 89:642-43
4. **Vincenzo Zannardo<sup>a,\*</sup>, Gary Weiner<sup>c</sup>, Massimo Micagliob, Nicoletta Doglionia,**
5. **Ramona Buzzacchero<sup>a</sup>, Daniele Trevisanuto<sup>a</sup>** Delivery room resuscitation of near-term infants: Role of the laryngeal mask airway. *Resuscitation* 81 (2010) 327–330
6. **Difficult airway society algorithm**, difficult airway society paediatric guideline on management