A clinical guideline recommended for use

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

Document Control:

For Use In:	Norfolk and Norwich University Hospitals (NNUH) Neonatal unit, Delivery Suite, Obstetric theatres, CAU and Any clinical area where neonatal resuscitation is required – Neonatologists, Anaesthetists		
Search Keywords	Newborn, difficult airway.		
Document Author:	Dr. P. Muthukumar, Consultant Neonatologist Jacqui Jones, sANNP		
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Version	Date	Author	Reason/Change
V1.0	July 2014	Consultant Neonatologist	To originate document
V3.3	June 2024	Consultant Neonatologist	Transferred to Procedural Document Template Added the new NLS algorithm

Previous Titles for this Document:

Previous Title/Amalgamated Titles	Date Revised
None	Not applicable

Distribution Control

Printed copies of this document should be considered out of date. The most up to date version is available from the Trust Intranet.

Consultation

The following were consulted during the development of this document:
Neonatal team (represented by consultants, Senior nurses, Governance team) through the Governance meeting

Monitoring and Review of Procedural Document

The document owner is responsible for monitoring and reviewing the effectiveness of this Procedural Document. This review is continuous however as a minimum will be achieved at the point this procedural document requires a review e.g. changes in legislation, findings from incidents or document expiry.

Relationship of this document to other procedural documents

This document is a clinical guideline applicable to Norfolk and Norwich University Hospitals (NNUH); please refer to local Trust's procedural documents for further guidance.

Guidance Note

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**.**

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Quick reference guideline: Figure 1

PLAN A

PLAN B

*if attempting further intubation, consider why the previous attempt(s) failed;

what needs to change

PLAN D

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

1. Introduction

1.1. Rationale

This guideline has been developed based on the BAPM framework for practice (Ref 1)

A difficult airway may be defined as a clinical situation in which a trained practitioner experiences difficulty with face mask ventilation, difficulty with tracheal intubation, or both.

1.2. Objective

To improve neonatal airway management.
To support skilled health care professionals within Norfolk and Norwich university Hospital (NNUH) to safely manage a neonatal difficult airway

1.3. Scope

Around 1-2 per 1000 liveborn babies will require some assistance in breathing to transition successfully, and of these between 2-10% may not respond to mask ventilation leading to an attempt at intubation. Fortunately, intrauterine preparation for birth (full term) offers significant physiological adaptation to sustained hypoxia, offering potential for some resilience in the circumstance of a difficult airway problem. Unwell babies at delivery may however have less physiological reserve, particularly if they lack innate respiratory effort.

Airway adjuncts may help the practitioner to manage the neonatal airway, including when tracheal intubation has not been possible. Airway adjuncts include video laryngoscopes and supraglottic airway devices such as the laryngeal mask airway (LMA). Such adjuncts are emerging technologies in the neonate with evidence to support neonatal use increasing as companies manufacture equipment suitable for use at term and earlier gestations.

Practices in managing intubation of babies differ significantly, and a difficult airways plan is not present universally across UK paediatric and neonatal intensive care unit (NICU) settings. Freck et al (2) estimated that only 2/3 of neonatal units (NNU) had specific difficult airways equipment available and only 4 of 60 had a specific ‘can’t intubate, can’t oxygenate policy’. Variation in practice is particularly apparent in the approaches to the number of intubation attempts by one practitioner. There is an increasing awareness of the importance of human factors including task fixation and systems optimisation in successful preparation for, and dealing with, the difficult airway situation.

If the most senior experienced practitioner present is unable to stabilise the airway of a neonate, urgent assistance should be sought if practicable. Few NNUs will have immediate access to ENT surgeon or a paediatric respiratory specialist but most hospitals will have an anaesthetist present in the building who could be enlisted to help in emergencies.

1.4. Glossary

The following terms and abbreviations have been used within this document:

Term	Definition
NNUH	Norfolk and Norwich University Hospitals
IPPV	Intermittent positive-pressure ventilation
PEEP	Positive end-expiratory pressure
NGT	Nasogastric tube
LMA	Laryngeal mask airways
ET	Endotracheal
ENT	Ear, nose and throat
NNU	Neonatal units
PDA	Patent ductus arteriosus
RCUK	Resuscitation Council UK
BAPM	British Association of Perinatal Medicine
EIA	Equality Impact Assessment

2. Responsibilities

- Priya Muthukumar, Consultant Neonatologist – chief of service, paediatrics
- Florence Walston, Consultant Neonatologist – clinical lead, NICU
- David Booth, Consultant Neonatologist
- Jacqui Jones , Senior ANNP

3. Processes to be followed

3.1. Anticipating the difficult neonatal airway

There are broadly two instances where there is opportunity for a difficult airway to be anticipated in the neonate.

At time of planned airway intervention, especially intubation or extubation.

Babies most at risk include extremely preterm infants intubated for long periods of time, those who have had surgery (e.g., PDA ligation) and those who have grown poorly. Any planned intubation or extubation is an opportunity to anticipate and plan for a difficult airway. A standardised approach to management of the airway, including the difficult airway and ‘can’t intubate/can’t oxygenate’ situation, reduces the number of critical incidents during intubation. All neonates who need to be intubated for planned procedures should be considered at risk of having a difficult airway, although in practice this is rare.

3.2. Antenatally diagnosed problems impacting the airway (anatomical and/or neuromuscular)

Difficult airways may (in order of likelihood) be due to:

1. External airway compression from neck masses
2. Structural compromise to the airway
3. Craniofacial structural abnormalities including cleft palate, cranial dysostosis and syndromes affecting maxillofacial structures
4. Neuromuscular abnormalities

3.3. The unanticipated difficult neonatal airway: algorithm and guidance

3.3.1. Defining a 'difficult airway situation'

There is no absolute as to when a difficult airway situation might or should be declared. Factors which influence this declaration include:

1. Environment in which the situation occurs
2. Staff present
3. Patient factors (gestation, aetiology of the difficulty)
4. Equipment available

In the context of the unexpected difficult neonatal airway, it is likely that first responders will be trained in simple airway management (mask techniques, airway suction and possibly laryngeal mask airway use), as the principles of the Newborn Life Support Algorithm (RCUK) are well known and adopted throughout the UK (Appendix 1), more help subsequently could be sought from skilled practitioners such as Anaesthetists and ENT surgeons.

It is recommended that: if an experienced clinician has had **up to two** intubation attempts but failed to intubate **or** judges the airway to be a difficult airway, declare "**this is a difficult airway situation with failed intubation"** and proceed to activate the **difficult airway algorithm**

3.4. Implementing the Difficult Airway Framework

The framework consists of an Algorithm and suggested principles around training, simulations and debrief

Designated local neonatal airway leads at NNUH will take responsibility in ensuring effective implementation of the framework at NNUH.

3.5. The Framework Algorithm

The difficult airway algorithm provides a sensible, stepwise structure to the process management of the difficult neonatal airway in the acute situation.

Appendix 1. provides a template algorithm:

- Location of the difficult airway trolley
- Key telephone numbers for expert help to be contacted together with agreed 'trigger' phraseology to guarantee a response

In the algorithm A-D should be worked through sequentially:

- Plan A is designed to ensure the basics are being performed optimally and the process of getting help is set in motion.
- Plan B is designed to encourage thinking about alternative means to ventilate/deliver oxygen
- Plan C is designed to optimise oxygenation if ventilation is difficult and to prompt minimising airway trauma from repeated attempts while further help arrives
- Plan D is the final step, utilising expert help to secure the airway

Plan A: Pre intubation and first intubation attempt: Ensure right size mask is selected , head is in neutral position , follow 2 person technique , ensure LMA and video laryngoscope are ready and available if needed

Plan B: Can ventilate, cant intubate (first failed intubation). Further intubation attempt should be done by the most experienced team member. Ensure LMA, glidescope and a broad blade laryngoscope is available.

Consider reasons for failure:

- Use of premedication (if neonate is vigorous, vocal cord spasm)
- Cricoid pressure to improve view
- Use of smaller ET tube if larynx is visible but unable to pass tube

PLAN C: can ventilate, further failed intubation attempt:

Plan D: further failed attempt

4. Training and competencies

The allocated neonatal airway lead for the clinical area will take responsibility for setting up the equipment and ensuring team knowledge and training on relevant airway equipment.

There should be regular skills training so that all team members are familiar with the equipment to be used. In addition, simulation should be used, focused at testing processes and infrastructure across clinical teams. BAPM recommends that there should be no more than a maximum of 6 months between simulated difficult airway drills. The responsibility for ensuring that skills teaching, and regular simulation occur, lies with the local simulation lead.

In line with practice recommendations around debriefing from life support organisations such as the Resuscitation Council (UK), Advanced Life Support Group, and the Difficult Airway Society, any situation in which a difficult airway is declared/experienced should be debriefed appropriately and formally reviewed. This is key to ensuring that the process in place locally worked and was followed, any learning from the event is shared and appropriate changes to process implemented. The conduct of these reviews and dissemination of learning falls under the remit of the consultant leading the resuscitation.

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5. Monitoring Compliance

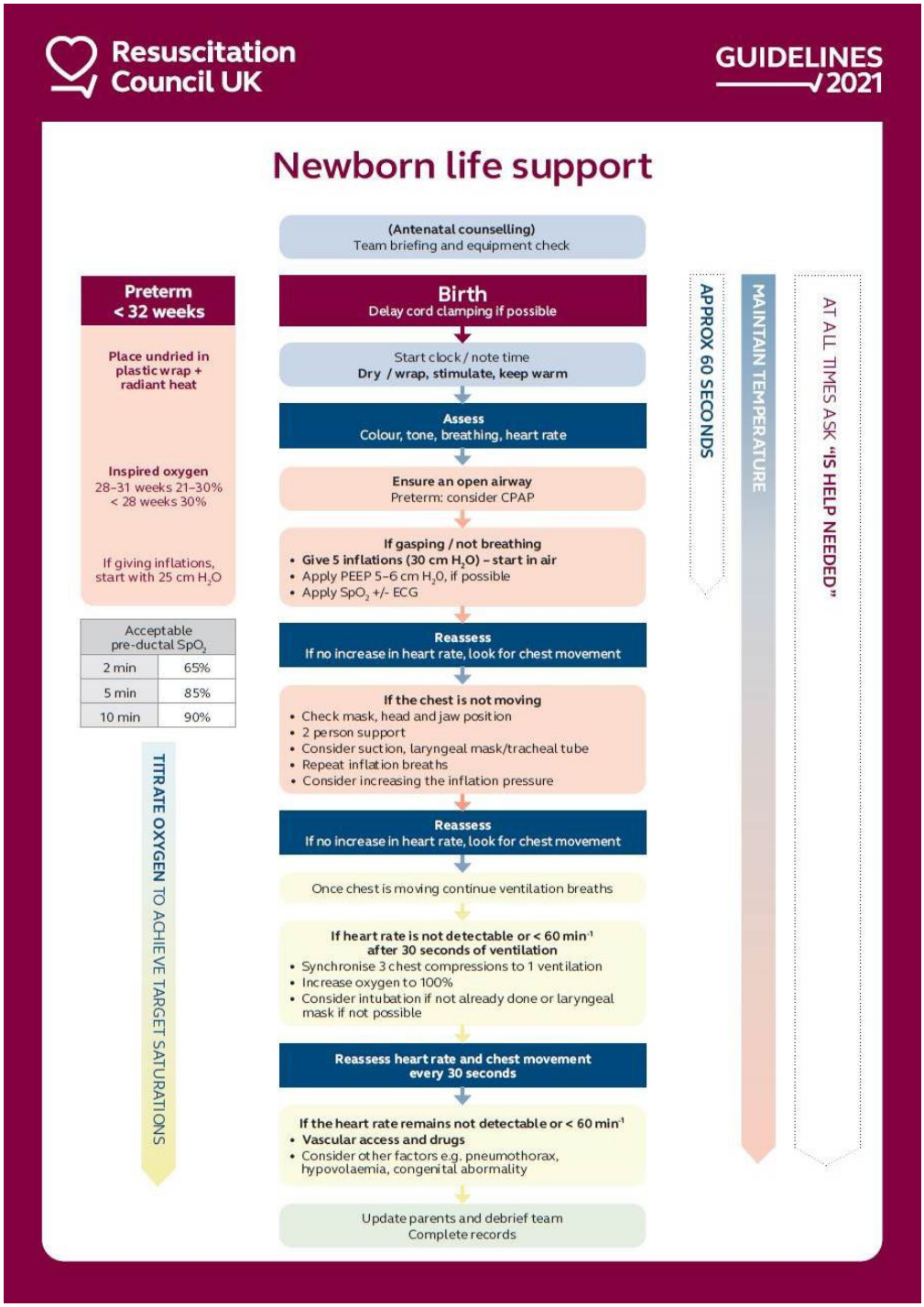
Compliance with the process will be monitored through the following:

Key elements	Process for Monitoring	By Whom (Individual / group /committee)	Responsible Governance Committee /dept	Frequency of monitoring
Compliance	Retrospective case note review of babies with a difficult airway to determine compliance with the guideline	Via audit, author and co-author to undertake	NICU Governance department (monthly meeting each 2nd Wednesday in each month))	Annual

The audit results are to be discussed at relevant governance meetings to review the results and recommendations for further action. Then sent to Women's and Children's Governance committee to be submitted to the divisional board who will ensure that the actions and recommendations are suitable and sufficient.

6. Appendices

Appendix 1 – NLS Algorithm



7. Equality Impact Assessment (EIA)

Type of function or policy	New

Division	Women's and Children's	**Department**	NICU
Name of person completing form	Priya Muthukumar	**Date**	30/05/23

Equality Area	Potential Negative Impact	Impact Positive Impact	Which groups are affected	Full Impact Assessment Required YES/NO
Race				No
Pregnancy & Maternity				No
Disability				No
Religion and beliefs				No
Sex				No
Gender reassignment				No
Sexual Orientation				No
Age				No
Marriage & Civil Partnership				No
EDS2 – How does this change impact the Equality and Diversity Strategic plan (contact HR or see EDS2 plan)?	No impact			

- **A full assessment will only be required if: The impact is potentially discriminatory under the general equality duty**
- **Any groups of patients/staff/visitors or communities could be potentially disadvantaged by the policy or function/service**
- **The policy or function/service is assessed to be of high significance**

IF IN DOUBT A FULL IMPACT ASSESSMENT FORM IS REQUIRED

The review of the existing policy re-affirms the rights of all groups and clarifies the individual, managerial and organisational responsibilities in line with statutory and best practice guidance.