

## LETTERS

## Neonatal airway practices: a telephone survey of all UK level 3 neonatal units

Neonatal airway management (NAM) and oxygenation are vital skills. Unrecognised oesophageal intubation is a common cause of endotracheal intubation (EI) failure and can result in mortality and significant morbidity. The Difficult Airway Society have algorithms for difficult airway management in adults and children<sup>1,2</sup> including a 'cannot intubate and cannot ventilate' (CICV) algorithm.<sup>2</sup> There are no nationally agreed guidelines or algorithms for NAM. The aim of this study is to determine NAM practises in UK level 3 neonatal intensive care units.

Between May and June 2013, a telephone survey of NAM, airway adjuncts and the possession of written NAM policies was undertaken in all UK level 3 neonatal units using a predetermined questionnaire.

All 59 units participated. All units used premedication for elective intubations. Suxamethonium was the most commonly used muscle relaxant along with an analgesic for sedation. Overall, 66% used colour-change capnography for endotracheal tube (ETT) placement confirmation. In all, 34% used them at every intubation. A total of 32% only used capnography if there was uncertainty about ETT position (low oxygen saturations and heart rate); 34% of units did not use capnography. In all, 53% limited the number of intubation attempts; two attempts was the most common limit set. Overall, 51% used oropharyngeal airways routinely; 68% had an emergency difficult airway kit, the contents of which varied (table 1). In all, 7% had a documented CICV policy.

This is the first review of UK NAM practices. The variation shown has potential for mismanagement of the neonatal airway. Capnography is standard adult practice and recommended by The Royal College of Anaesthetists and The Difficult Airway Society for every EI.<sup>3</sup> Overall, performance of neonatal EI is poor with success rates being as low as 21%.<sup>4,5</sup> Capnography for the confirmation of intubation success in neonates should be standard practice. During cardiac arrest, if exhaled CO<sub>2</sub> is not detected, ETT position should be confirmed using direct laryngoscopy prior to commencing a new intubation attempt. Repeated laryngoscopies should be avoided as they can cause significant trauma to the airway.

**Table 1** Neonatal airway management and adjuncts used

	Number of units (%)
<b>Standard airway</b>	
Use of muscle relaxants for every intubation?	
Yes	36 (61%)
No	23 (39%)
Reasons for non-routine use muscle relaxants?	
Elective intubation	23 (100%)
Type of muscle relaxant	
Suxamethonium	42 (71%)
Atracurium	10 (17%)
Vecuronium	4 (7%)
Atracurium or pancuronium	2 (3%)
Suxamethonium or pancuronium	1 (2%)
Type of sedation	
Analgesia (fentanyl or morphine)	48 (81%)
Propofol	6 (10%)
Midazolam	5 (9%)
Limitation of intubation attempts	
Exact limit=2	31 (53%)
Exact limit=3	30 (51%)
Oropharyngeal airway use for airway management on neonatal intensive care unit	30 (51%)
ETCO <sub>2</sub>	
Colour-change ETCO <sub>2</sub> for ETT placement confirmation	39 (66%)
Routine use of colour-change ETCO <sub>2</sub>	20 (34%)
Non-routine use of colour-change ETCO <sub>2</sub> (used if poor HR/SaO <sub>2</sub> postintubation or lack of confidence in ETT position)	19 (32%)
<b>Difficult airway</b>	
Possession of a difficult airway kit	40 (68%)
Possession of a departmental CICV algorithm?	4 (7%)
Use of LMA if in CICV scenario	9 (15%)

CICV, cannot intubate and cannot ventilate; ETCO<sub>2</sub>, End tidal carbon dioxide; LMA, laryngeal mask airway; SaO<sub>2</sub>, oxygen saturations.

Human factors such as stress, poor communication, leadership, team working or inadequacy of equipment can all contribute to a poor outcome in a difficult airway situation. To prevent this, standardisation of practice with evidence based or consensus guidelines is warranted via documented airway management algorithms (suggested CICV algorithm: figure 1) and to avoid the inequality between neonatal and adult and paediatric airway management practices.

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## Cannot intubate cannot ventilate (CICV) algorithm in an unconscious neonate

Failed intubation, inadequate ventilation

**CALL FOR HELP**

### Step A: optimise ventilation

Airway to be managed by most experienced personnel present  
 Give 100% oxygen  
 Continue facemask IPPV using two person technique  
 Ensure no mechanical obstruction  
 Optimise head position and chin lift/jaw thrust  
 Insert Oropharyngeal airway or laryngeal mask airway  
 Minimise gastric distension by insertion of orogastric tube and frequent aspiration

### Step B: prepare for rescue techniques

#### Obtain difficult airway kit

If rocuronium or vecuronium used consider reversal of paralysis with sugammadex (16mg/kg)

### Step C: airway rescue techniques for CICV To be carried out by ENT / anaesthetist

**CALL FOR HELP: ENT/Anaesthetist urgently**

Prepare for:  
 Percutaneous cannula cricothyroidotomy  
 Surgical tracheostomy

**Figure 1** Cannot intubate cannot ventilate algorithm in an unconscious neonate.

tertiary neonatal intensive care units. *Resuscitation* 84: 1359–64.

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