# Paediatric Airway Guidelines 2012

The following three guidelines relate to the management of the unanticipated difficult airway in children aged 1 to 8 years.

They are:

- Difficult mask ventilation during routine induction of anaesthesia in a child aged 1 to 8 years
- Unanticipated difficult tracheal intubation during routine induction of anaesthesia in a child aged 1 to 8 years
- Cannot intubate and cannot ventilate (CICV) in a paralysed anaesthetised child aged 1 to 8 years

Paediatric patients are looked after in many hospitals and specialist paediatric services are neither necessary nor appropriate in all settings. The target audience for these guidelines is for the non-specialist anaesthetist who wishes to learn or maintain paediatric airway skills, rehearse unexpected difficult airway scenarios and teach good practice.

These guidelines are clinical, but are backed by a robust process. A formal paper giving all the background data used to develop these guidelines will be published in the near future.

Internationally it was clear that most units are using airway management guidelines for children that have been expanded from adult practice. We have therefore specifically developed these guidelines following an exhaustive process that involved a Delphi analysis (which ensured careful refection of each step of the pathway, and a grading of how confident an expert group was in endorsing each step), and an extensive literature review. Following this we had further external reviews, and placed the guideline on the APA website requesting comments-all views were considered. There is very little grade 1, (randomised control trial), evidence to support good practice in the management of the difficult paediatric airway, and guidance must therefore be essentially a clinical issue.

The Guidelines Group supported by the Association of Paediatric Anaesthetists, the Difficult Airway Society and liaising with the RCoA, has taken a careful and thorough approach to review current practice. We hope these guidelines will be used widely, and would encourage feedback. We trust that, long term; they will be of use to all anaesthetists who manage children in day-to-day clinical practice, and those who teach safe airway techniques.

# Difficult mask ventilation (MV) – during routine induction of anaesthesia in a child aged 1 to 8 years

**Difficult MV** → **Give 100% oxygen** → **Call for help**

## Step A Optimise head position

Check equipment

Depth of anaesthesia

Consider:
- Adjusting chin lift/jaw thrust
- Inserting shoulder roll if <2 years
- Neutral head position if >2 years
- Adjusting cricoid pressure if used
- Ventilating using two person bag mask technique

Consider changing:
- Circuit
- Mask
- Connectors

If equipment failure is suspected, change to self-inflating bag and isolate from anaesthetic machine promptly

Consider deepening anaesthesia

Use CPAP

## Step B Insert oropharyngeal airway

**Call for help again if not arrived**

Assess for cause of difficult mask ventilation
- Light anaesthesia
- Laryngospasm
- Gastric distension – pass OG/NG tube

Maintain anaesthesia/CPAP

Deepen anaesthesia (Propofol first line)
- If relaxant given – intubate
- If intubation not successful, go to unanticipated difficult tracheal intubation algorithm

## Step C Second-line: Insert SAD (e.g. LMA™)

- Insert SAD (e.g. LMA™) – **not > 3 attempts**
- Consider nasopharyngeal airway
- Release cricoid pressure

**Good airway**

**Yes** → **Continue**

**No**

**$SpO_2$ >80%**

Consider:
- SAD (e.g. LMA™) malposition/blockage
- Equipment malfunction
- Bronchospasm
- Pneumothorax

→ **Wake up patient**

**$SpO_2$ <80%**

Attempt intubation
- Consider paralysis

**Succeed** → **Proceed**

**Fail** → **Go to scenario cannot intubate cannot ventilate (CICV)**

SAD = supraglottic airway device

# Unanticipated difficult tracheal intubation – during routine induction of anaesthesia in a child aged 1 to 8 years

**Difficult direct laryngoscopy** → **Give 100% oxygen and maintain anaesthesia** → **Call for help**

## Step A Initial tracheal intubation plan when mask ventilation is satisfactory

Ensure: Oxygenation, anaesthesia, CPAP, management of gastric distension with OG/NG tube

Direct laryngoscopy – **not > 4 attempts**

Check:

- Neck flexion and head extension
- Laryngoscopy technique
- External laryngeal manipulation – remove or adjust
- Vocal cords open and immobile (adequate paralysis)

If poor view – consider bougie, straight blade laryngoscope* and/or smaller ETT

→ **Succeed** → Tracheal intubation → Verify ETT position
- Capnography
- Visual if possible
- Ausculation

If ETT too small consider using throat pack and tie to ETT

**If in doubt, take ETT out**

→ **Failed intubation with good oxygenation**

## Step B Secondary tracheal intubation plan

**Call for help again if not arrived**

- Insert SAD (e.g. LMA™) – **not > 3 attempts**
- Oxygenate and ventilate
- Consider increasing size of SAD (e.g. LMA™) once if ventilation inadequate

→ **Succeed** →
- Consider modifying anaesthesia and surgery plan
- Assess safety of proceeding with surgery using a SAD (e.g. LMA™)

→ **Unsafe** → **Postpone surgery Wake up patient**

→ **Safe** → **Proceed with surgery**

→ **Safe** →
- **Consider 1 attempt at FOI via SAD (e.g. LMA™)**
- Verify intubation, leave SAD (e.g. LMA™) in place and proceed with surgery

→ **Succeed** → **Proceed with surgery**

→ **Failed intubation via SAD (e.g. LMA™)** → **Postpone surgery Wake up patient**

→ **Failed oxygenation e.g. $SpO_2$ <90% with $FiO_2$ 1.0**

- Convert to face mask
- Optimise head position
- Oxygenate and ventilate
- Ventilate using two person bag mask technique, CPAP and oro/nasopharyngeal airway
- Manage gastric distension with OG/NG tube
- Reverse non-depolarisating relaxant

→ **Succeed** → **Postpone surgery Wake up patient**

→ **Failed ventilation and oxygenation** → **Go to scenario cannot intubate cannot ventilate (CICV)**

Following intubation attempts, consider • Trauma to the airway • Extubation in a controlled setting

*Consider using indirect larygoscope if experienced in their use

SAD = supraglottic airway device

# Cannot intubate and cannot ventilate (CICV) in a paralysed anaesthetised child aged 1 to 8 years

**Failed intubation inadequate ventilation** → **Give 100% oxygen** → **Call for help**

## Step A Continue to attempt oxygenation and ventilation

- $FiO_2$ 1.0
- Optimise head position and chin lift/jaw thrust
- Insert oropharyngeal airway or SAD (e.g. LMA™)
- Ventilate using two person bag mask technique
- Manage gastric distension with an OG/NG tube

## Step B Attempt wake up if maintaining $SpO_2$ >80%

If rocuronium or vecuronium used, consider suggamadex (16mg/kg) for full reversal

Prepare for rescue techniques in case child deteriorates

## Step C Airway rescue techniques for CICV ($SpO_2$ <80% and falling) and/or heart rate decreasing

**Call for help again if not arrived**

Call for specialist ENT assistance

**ENT available**

Consider:
- Surgical tracheostomy
- Rigid bronchoscopy + ventilate / jet ventilation (pressure limited)

**ENT not available**

Percutaneous cannula cricothyroidotomy / transtracheal jet ventilation (pressure limited)

**Succeed**

Continue jet ventilation set to lowest delivery pressure until wake up or definitive airway established

**Fail**

- Perform surgical cricothyroidotomy / transtracheal and insertion of ETT / tracheostomy tube*
- Consider passive $O_2$ insufflation while preparing

**Cannula cricothyroidotomy**

- Extend the neck (shoulder roll)
- Stabilise larynx with non-dominant hand
- Access the cricoithyroidotomy membrane with a dedicated 14/16 gauge cannula
- Aim in a caudad direction
- Confirm position by air aspiration using a syringe with saline
- Connect to either:
  - adjustable pressure limiting device, set to lowest delivery pressure

  or
  - 4Bar $O_2$ source with a flowmeter (match flow l/min to child's age) and Y connector
- Cautiously increase inflation pressure/flow rate to achieve adequate chest expansion Wait for full expiration before next inflation
- Maintain uper airway patency to aid expiration

*Note: Cricothyroidotomy techniques can have serious complications and training is required – only use in life-threatening situations and convert to a definitive airway as soon as possible

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