

PICU Intubation Guideline

This Guideline is for use by Non-Anaesthetic Medical Staff on PICU intubating children as part of their clinical practice. It will also be used by nursing staff to help set up for intubation. Anaesthetists may use agents that they are more familiar with, but if they deviate from the guideline it is their responsibility to ensure that any staff helping them are appropriately prepared.

Assessment.

How urgent is the intubation?

- Is the airway clear and open?
- Is the patient breathing spontaneously?
- Is/can the patient being/be oxygenated with bag/mask or high flow oxygen?

Proceed to immediate intubation **only** if the patient cannot be oxygenated without intubation.

In all other circumstances:

Perform an assessment of the airway and the patient.

- Does the patient have an anatomical abnormality that would predict difficult intubation – reduced neck movement or jaw opening, micrognathia, macroglossia, obvious deformity of face or anterior neck or significant bleeding into the airway? Call for an anaesthetist.
- Is there evidence of airway obstruction – Stridor or severe recession? Call for an anaesthetist.
- Is the patient hypotensive/hypovolaemic? Are they known to have a Fontan/Glenn (single ventricle with cavo-pulmonary shunt) type circulation? Call for an anaesthetist and call/discuss with PICU consultant
- Can you be sure that the stomach is empty? If not prepare for rapid sequence intubation (RSI) and call for an anaesthetist if you are not competent to perform RSI.

If you are happy to proceed, ensure that there is another doctor present.

Call for appropriate help (as above), prepare patient (as below) and assemble drugs and equipment while waiting for help to arrive (see checklists).

Prepare the patient:

- Explain to patient and/or parent.
- Pre-oxygenate (as high an oxygen concentration as possible, for as long as possible).
- Apply monitoring and obtain baseline readings (ECG, SpO₂, BP, check capillary refill time).
- Obtain/check existing venous access (except in patients with airway obstruction where you should not attempt to obtain venous access)

Continue to resuscitate hypovolaemic patients as appropriate and ensure you have epinephrine and boluses of fluid (20/ml/kg) drawn up.

- Aspirate NG/OG tube if present. Aspirate with the child in multiple positions (i.e. Prone, on both sides, sitting and steep head down) if clinically appropriate.

Wait for help. Continue to support and re-assess the patient and be prepared to intubate if deterioration in condition requires urgent intervention.

Intubation

Once help arrives, clarify roles, ensure you have an assistant who can apply cricoid pressure (if needed) and proceed with intubation.

In the cardiovascularly stable patient use propofol (titrate to effect. Usual dose is 1-3 mg/kg). Otherwise use ketamine (0.5 – 2mg/kg). Ensure somebody will palpate a pulse or observe arterial line trace (where present) throughout the intubation.

If you can be sure that the stomach is empty use rocuronium 0.5mg/kg as a muscle relaxant. Otherwise perform RSI using rocuronium 1mg/kg or Suxamethonium (2mg/kg in infants and 1 mg/kg in older children) + atropine 20microg/kg (minimum dose 150microg)

An intubation attempt should last no longer than one minute. Many of our patients will desaturate before a minute has expired even if adequately preoxygenated. If you cannot intubate within one minute proceed to failed intubation guideline (see below)

- Secure the airway orally.
- Confirm tube position by use of EtCO₂ detector or capnograph (remember no CO₂ is produced in cardiac arrest).
- Auscultate to ensure ETT not down a main bronchus.
- Secure the ET tube.
- Administer a bolus of sedation (midazolam 0.1 mg/kg) if propofol has been used – propofol will have worn off before muscle relaxant does.

After intubation

Decide if you need to give continuous sedation and/or muscle relaxants.

Site an orogastric/nasogastric tube (NG contraindicated in coagulopathy or possible base of skull fracture)

Consider changing oral tube to nasotracheal.

- Can you do it safely?
- Is the patient stable?
- Are there any contraindications?

Perform Chest X-ray to confirm position of ET and NG/OG tubes.

Document your intubation (use sticker if possible).

If you can't intubate at the first attempt

Maintaining oxygenation is your priority. Bag & mask ventilate the patient with 100% O₂.

Can't intubate, can ventilate.

If you are able to ventilate the patient easily then what you do next depends on what you were able to see on your first attempt at intubation.

If you were able to visualise the epiglottis (Grade I – III), then it is reasonable for you to have **one more** attempt at intubation once the saturations have recovered to their pre-intubation level. Consider:

- re-adjusting the head position,
- using a malleable introducer or bougie and/or
- changing your laryngoscope blade

before starting your second attempt.

If you cannot intubate at your second attempt, call for anaesthetic help (if not already present) and continue bag mask ventilation.

If you were unable to visualise the epiglottis (Grade IV) then do not try again. Call for anaesthetic help (if not already present) and continue bag mask ventilation.

Use of LMA

If your patient is still anaesthetised and paralysed consider placing a Laryngeal Mask Airway (LMA) if you are familiar with its use.

Continue further management as clinically appropriate until further help arrives. Depending on the situation this may involve allowing the patient to recover from the drugs used and resuming spontaneous respiration or giving further anaesthesia and continuing to ventilate.

Can't intubate, Can't ventilate.

Bag/mask ventilation remains the method of choice.

Call for help – Anaesthetist and PICU consultant

Perform the following manoeuvres in sequence:

- Airway opening as per BLS guidelines (inspection of airway, suction, head positioning, jaw thrust)
- Use of an airway (Guedel or Nasopharyngeal unless contraindicated)
- Use both hands to hold mask and get assistant to squeeze bag
- Turn patient onto side
- Relax cricoid pressure if applied (try releasing altogether if this is unsuccessful)

If you are still unable to ventilate, place an LMA. Laryngoscopy may help you to site the LMA correctly.

Still can't ventilate – Perform needle cricothyroidotomy. Await more senior help to obtain a definitive airway.

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Assess.

Two doctors present if possible.

Preoxygenate with 100% O₂
Aspirate OG/NG tube if present

Airway Obstruction or probable difficult intubation?

No

Yes

Seek senior anaesthetic help

Potential cardiovascular compromise?

Yes

No

Seek senior help

Ketamine 0.5-2mg/kg

Propofol 1-3mg/kg

Risk of aspiration?

Yes

No

Rapid Sequence Induction with cricoid pressure.

Suxamethonium 1-2mg/kg +
Atropine 20microgram/kg. (min 150)

or
Rocuronium 1mg/kg

Rocuronium 0.5mg/kg

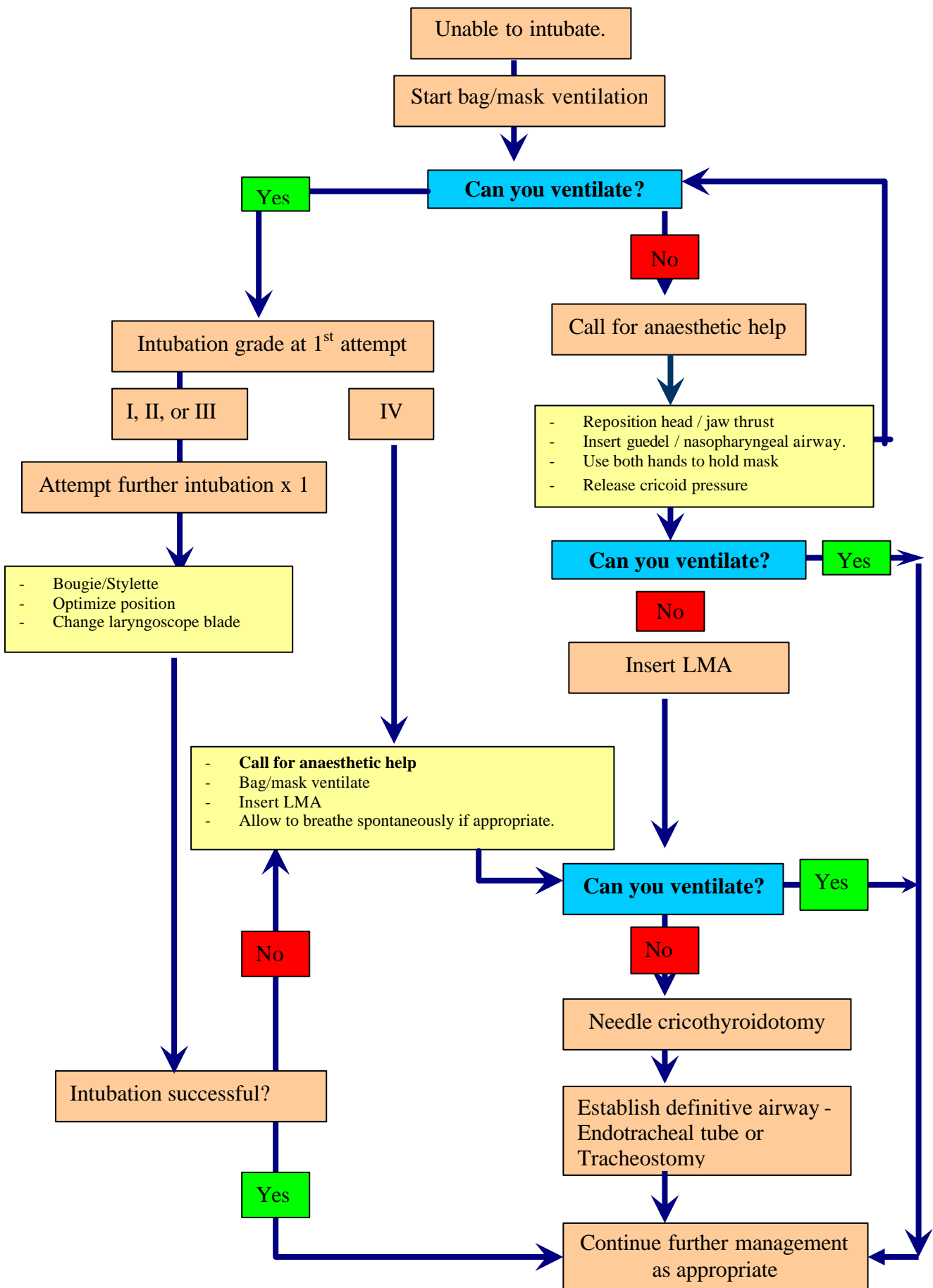
- **Intubate orally**
- Confirm ET tube position by ETCO₂ and auscultation
- Consider IV bolus of sedation.
- Secure ET tube.

Evaluate need for muscle relaxant and continuous sedation

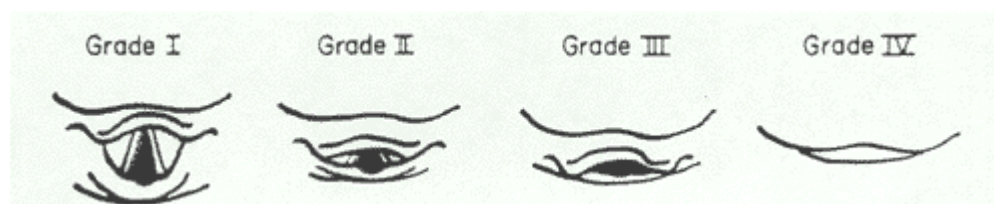
- o Morphine 10-40microgram/kg/hr
- o Midazolam 1-6microgram/kg/min
- o Atracurium 1mg/kg/hr

- Place NG or OG tube.
- Consider nasal tube
- Check tube positions by CXR.
- Document intubation with sticker.

PICU Failed Intubation Drill



Grades of Laryngoscopy (Cormack and Lehane classification)



- Grade I: complete glottis visible
- Grade II: anterior glottis not seen
- Grade III: epiglottis seen, but not glottis
- Grade IV: epiglottis not seen

LARYNGEAL MASK AIRWAY SIZES

Size of LMA	Patient Weight (Kg)	Cuff Volume (ml)
1	< 5	2 - 5
1.5	5 - 10	5 - 7
2	10 - 20	7 - 10
2.5	20 – 30	12- 14
3	> 30	15 - 20
4	Adult female	25 - 30
5	Adult Male	40

Contact numbers for Anaesthetists

LGI

Anaesthetist	Bleep	Ward Phone
Ward 3 (Adult ICU)	80-3451	27103
Ward 6 (Neuro ICU)	80-2822	27106
Cardiac ICU	80-2915	27105/27107
Acute	80-2752	
1 st On SpR – night	80-2506	
1 st on SpR – day	80-2507	
Obstetrics	80-1340	

SJUH

Anaesthetist	Bleep	Ward Phone
Labour Ward	80-5012	65371
Acute	80-5011	

Preintubation equipment checklist:

- Self inflating bag and anaesthetic circuit €
- Face masks, Guedel and nasopharyngeal airways. €
- Tracheal tubes – one size above and below the estimated size. €
- Two working laryngoscopes. €
- Magill's forceps. €
- Gum elastic bougie and malleable introducer. €
- Laryngeal mask airway. €
- Suction apparatus, Yankauer's sucker and suction catheters. €
- Connector, cuff inflating syringe, Tape, lubricant. €
- CO₂ detector. €

Preparation:

- Obtain help/presence of two doctors if possible. €
- Inform patient/parent €
- Check oxygen supply and bagging circuit. €
- Check suction apparatus. €
- Monitoring – ECG, Pulse oximetry, ETCO₂ or CO₂ detector. €
- Obtain / check intravenous access. €
- Availability of resuscitation drugs. €
- Labelled syringes of anaesthetic drugs. €