Clinical Guidance

Paediatric Critical Care: Intubation Guideline

Summary
The guideline sets out the steps for safe intubation. It details the indications and preparation for intubation and also the considerations to be taken if it is a high risk intubation. Information and steps are also included to follow if there is a difficult intubation or ventilation situation. This guideline can be used outside of the intensive care setting e.g. theatres/ ED/ ward areas.

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This clinical guideline has been produced by the South Thames Retrieval Service (STRS) at Evelina London for nurses, doctors and ambulance staff to refer to in the emergency care of critically ill children. This guideline represents the views of STRS and was produced after careful consideration of available evidence in conjunction with clinical expertise and experience. The guidance does not override the individual responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient.	

Glossary: GCS-Glasgow Comma Scale, **SAD**-Supraglottic airway device

Change History		
Date	Change details, since approval	Approved by
July 2024	No Change	ELCGC July 2024

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South Thames Retrieval Service

Oxygenation is the most important factor. No CO_2 Trace = Wrong Place

Indications for Intubation
A - Airway compromise
B - Impending respiratory failure (hypoxia/ hypercapnia/ exhaustion)
C - Minimise oxygen consumption and optimise oxygen delivery
D - Decreased level of consciousness (GCS less than 8)
E – For procedures, temperature control, sedation or pain management

Assessment of the patient
- Is the airway open and clear?
- Is the patient breathing spontaneously?
- Is the patient sufficiently oxygenating with a mask or high flow oxygen?

If answer to any above is no – optimise airway, ensure breathing is supported and ensure adequate oxygenation before proceeding to urgent Intubation as per HELP KIDS check list

High Risk Intubations

History: discuss with family and look on EPIC/ anaesthetic notes
- Difficult bag mask ventilation or intubation (C-L grade 2-4)
- Adverse reaction to anaesthesia or family history of this

Anatomical: limited mouth opening, neck stiffness, jaw protrusion
- Obstructive or deforming head and neck lesions or surgery
- Clinical syndromes (Trisomy 21, Pierre Robin, Hurlers etc)

Airway obstruction: croup, epiglottitis, foreign body, burns
- Mediastinal mass highest risk

Pulmonary reserve limited: Asthma, ARDS, chronic lung disease
Cardiovascular instability
Aspiration risk: full stomach/ delayed gastric emptying

Do not proceed without advice from PICU consultant

If intubation has been difficult
Do not change the ETT unless discussed with PICU Consultant

Extubation should be undertaken in a controlled environment

Preparation
See Help Kids Check list

PLAN A – 1st Intubation Attempt

Failed intubation
Oxygenate via mask
Consider SAD (LMA)
Call for senior help

2nd Intubation Attempt

Confirm adequate muscle relaxation
And optimal head and neck position
Consider:
- changing size of ETT/ blade
- video laryngoscope/ bronchoscope
- bougie or stylet

Failed intubation
Oxygenate via mask
Consider SAD
Call for senior help

PLAN B – Change to Senior Operator after 2 attempts

Failed intubation
Not more than 2 attempts
Oxygenate via mask
Consider SAD
Call for PICU consultant and/or Anaesthesia

PLAN C – Assisted Intubation Requires PICU Consultant (+/-) Anaesthetics/ENT
DAS unanticipated difficult intubation

Successful Intubation
- Confirm ETT position and adequate ventilation with $ETCO_2$
- Secure ETT
- CXR

Failed Intubation
- Oxygenate via mask
- Consider SAD
- Discuss with Anaesthesia and ENT for transfer to theatre

Difficult mask ventilation
- Optimise head position
- Insert oropharyngeal airway
- Adjust cricoid pressure if used
- Ventilate using 2 person technique
- Manage gastric distention
- Ensure adequate anaesthesia & muscle relaxation
- Check equipment
- Insert SAD not > 3 attempts
- Call for senior help

DAS difficult mask ventilation

Cannot Oxygenate via SAD
- Revert to face mask and attempt to ventilate with 100% oxygen
- (See box above to optimise mask ventilation)
- Call for senior help
- Consider upsizing SAD – no more than 1 attempt

Cannot Oxygenate Via mask or SAD – saturations <80% (or 15% < baseline in cyanotic heart disease) and falling and/ or bradycardia
- Attempt Intubation
- Consider video laryngoscope if immediately available

Can't Intubate, Can't Ventilate Scenario (CICV)
- FiO_2 100% via mask with PEEP
- Call for senior help – PICU / Anaesthesia / ENT
- Get difficult airway trolley from theatre
- Optimise as per difficult mask ventilation box
- Consider SAD
- For CICV protocol and Front of neck access refer to Evelina Paediatric difficult airway management guideline or DAS CICV paediatrics

Troubleshooting (DOPES)
- Displacement
- Obstruction
- Pneumothorax
- Equipment
- Stomach

AND • Unusual diagnoses e.g. Vascular rings or tracheal

Reference: APA DAS Paediatric Difficult Airway Guidelines 2015

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SIDE A

Intubation Pathway – H.E.L.P.K.I.D.S.

Start here.
Emergency Intubation?

Yes → **No**

***EQUIPMENT SIZES**
Uncuffed ETT size – Term Neonate 3.5,
- 5 months 4.0
- >1 year (Age/4) + 4

Micro Cuffed ETT size – as per manufacturer
Length - Oral ETT - <1 year as per STRS app
- >1 year (Age/2)+12
- Nasal ETT = oral + 2-3cm

Bougie 5Ch ETT range ≤ 3.5
- 10Ch ETT sizes = 4.0 – 5.5
- 15Ch ETT sizes ≥ 6.0

LMA Size 1.0 – <5kg
- Size 1.5 – 5-10kg
- Size 2.0 – 10-20kg
- Size 2.5 – 20-30kg
- Size 3.0 – 30-50kg
- Size 4.0 - >50kg

H	**Is this High Risk?**	Previous intubation grade? ENT needed? CV instability? Vasopressors/Inotropes? **Senior opinion early**
E	**Equations**	Weight Drug doses ——— Standard regime Equipment sizes 1) Fentanyl 2mcg/kg 2) Ketamine 2mg/kg 3) Rocuronium 1mg/kg
L	**Look at the child**	Any predictors of difficult airway? Consider optimal position?
P	**Parent brief**	Parents may wish to be present Explain – no issues are expected and 'Plan B' safety briefings are routine
K	**Get Kit ready**	Attach all relevant monitoring Whenever possible, get kit from stores. The Airway Trolley is for emergencies.
I	**IV access**	Secure and flush IV access Aim to have two IV sites
D	**Draw up drugs**	Prescribe on chart Flushes Fluid boluses Consider adrenaline **EMERGENCY DRUGS CLEAR LABELS SEPARATE TRAY**
S	**Empty Stomach**	Starvation status Place NG Aspirate regularly when mask ventilating

TURN OVER TO SIDE B NOW – FINAL FAST CHECK

Post Intubation	✓ Tapes – see STRS guideline ✓ Initiate sedation ✓ Start on ventilator ✓ Suction +/- BAL samples ✓ Chest XRay – Bleep 1188 ✓ Restock Airway Trolley

SIDE B

FINAL FAST PRE-INTUBATION CHECK - FOR ALL INTUBATIONS

Start here
Read aloud to team

PREPARE

- Is Nurse-In-Charge aware?
- Is Senior PICU Dr aware?
- 3 minutes Pre-Oxygenate
- Optimise positioning
- Aspirate stomach

How to Use: -
A FEW MINUTES ONLY
KIT SHOULD ALREADY BE PRESENT
TEAM FOCUS IN - QUIET
CLEAR COMMUNICATION
READ ALL 3 SECTIONS
CHALLENGE RESPONSE
e.g."Mask" "Check!"

Caution should be taken to ensure nothing is introduced into the airway

EQUIPMENT

MONITOR	☐ $ETCO_2$ attached ☐ Audible O_2Sat 'beeps' ☐ BP cuff - Auto 2min ☐ ECG
BEDSIDE KIT	☐ Anaesthetic Circuit ☐ Yankauer Suction ☐ Mask ☐ OPA/Guedel
INTUBATION	☐ Two laryngoscopes ☐ Bulbs checked? ☐ ET tubes ☐ Size up/size down
AUXILARY KIT	☐ Syringe? Check cuff ☐ Magills ☐ Video Laryngoscope ☐ Bougie and/or Stylet ☐ LMA + syringe for it
CIRC.	☐ Flush IV Access ☐ Fluid Bolus ☐ Inotropes if needed?

TEAM BRIEF – ALL EYES IN!

PEOPLE	(STATE NAMES OUT LOUD) • Who is intubating? • Who is assistant? • Who is drug giver? • Identify other team members
PLAN	• What is the Procedure Plan? • Confirm drug doses
PROBLEMS	• Predictable issues? • What is PLAN B (Plan C)? • HELP – Who? • How do we get hold of them?

READY TO INTUBATE

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