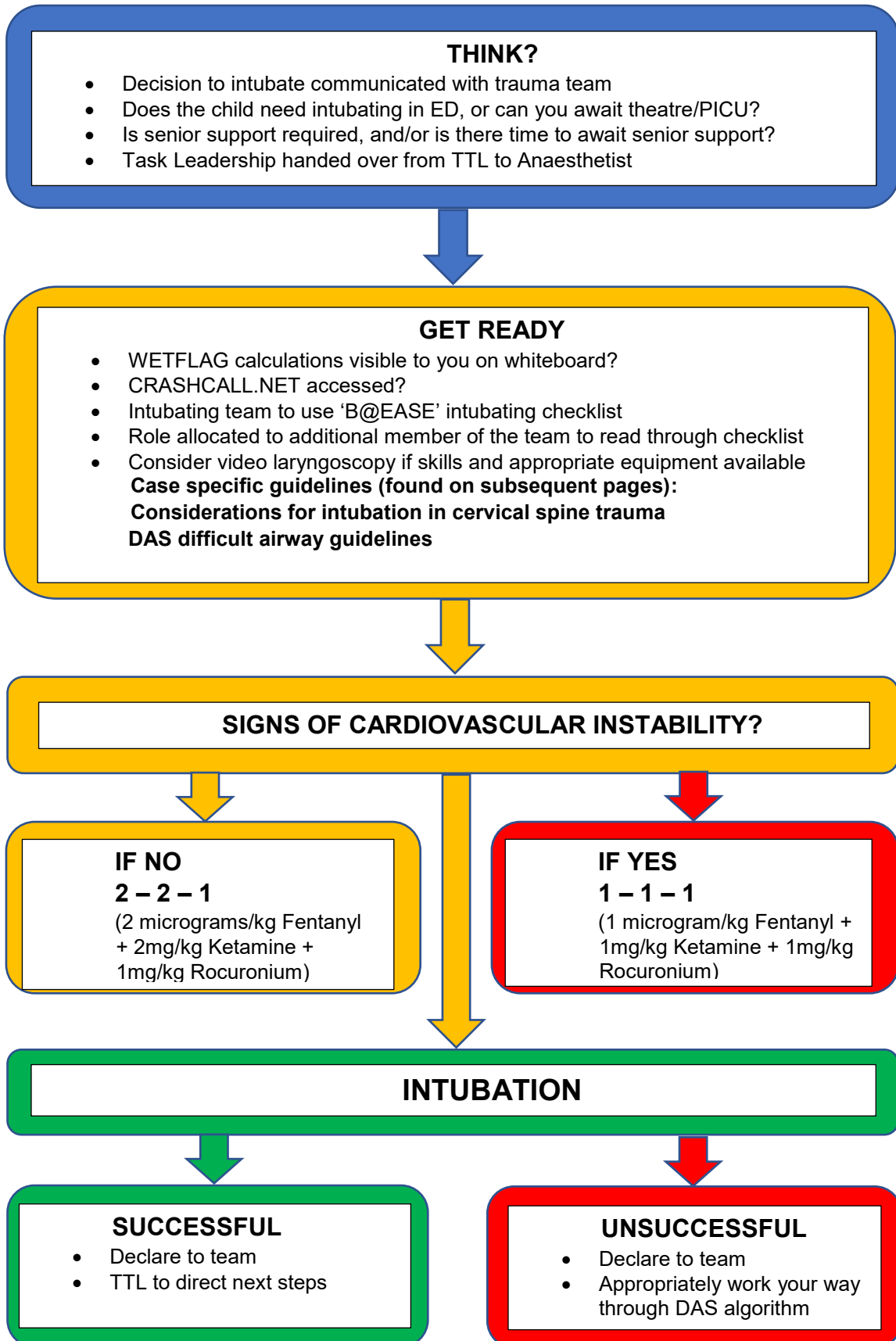




Trauma Team

Source Document:	North West Children's Major Trauma Operational Delivery Network (ODN) Clinical Guidelines
Version:	4
Ratification Date:	10/11/2023

Emergency Airway Management Emergency Airway Management Paediatric Trauma Intubation Management Tool



Emergency Airway Management **Paediatric Trauma Intubation Associated Notes**

With reference to the flowchart on the previous page

Think?

- Decision to intubate is made by the anaesthetist, alongside input from the full trauma team
- Once decision made to intubate, this must be clearly communicated with trauma team leader (TTL)
- At this point, task leadership is passed to the anaesthetic team
- Note: Is ED the safest place to intubate this child? Does the child have an anticipated difficult airway? If so, is it safer to intubate in theatre? Is this patient safe to transfer un-intubated to PICU or theatre?
- Does a consultant anaesthetist need to be involved in the airway management of this child?
- Allocate one person to write all WETFLAG calculations on a whiteboard
- Allocate one person to access CRASHCALL.NET calculations for this patient on a nearby computer

GET READY

- Use the **B@EASE** intubating checklist
- Allocate one team member to read out checklist to the entire trauma team
- B@EASE is a 'Challenge and Response' checklist. Ask the question, and await the response
- No other patient interventions should be performed during this time unless necessary

- If cardiovascular instability is **NOT** suspected, then we advise safe use of **FENTANYL, KETAMINE and ROCURONIUM in a ratio of 2-2-1** (2 micrograms/kg Fentanyl + 2mg/kg Ketamine + 1mg/kg of Rocuronium)
- If cardiovascular instability **IS** suspected, then we advise safe use of **FENTANYL, KETAMINE and ROCURONIUM in a ratio of 1-1-1** (1 microgram/kg of Fentanyl + 1mg/kg of Ketamine + 1mg/kg of Rocuronium)

- Drug dose adjustments may be needed depending on the clinical circumstances
- The anaesthetist should use drugs within their area of expertise
- Propofol can be safely used providing you prepare for potential cardiovascular effects
- If you plan on the use of Rocuronium, ensure you are aware of where sugammadex is available
- Appropriate fluid resuscitation is important prior to induction of anaesthesia
- Adrenaline is a useful drug if required to preclude cardiac arrest in severely shocked patients on induction of anaesthesia. ***0.1mL/kg of 1:10,000 adrenaline, made up to 10mL with sodium chloride 0.9%***. Safely give 1ml aliquots of this solution as required administered IV/IO
- Ensure plan for continuing anaesthesia

INTUBATION

- Ensure you have control of the room and the team
- Minimise noise and ask for any excess team members to leave the room to reduce distractions
- **IF SUCCESSFUL**, then communicate this with the trauma team
- **IF NOT SUCCESSFUL**, then communicate this with the trauma team, and work through the DAS failed intubation algorithm

Considerations for intubation in Cervical Spine Trauma

Risk Factors

- GCS<13
- Multi region trauma
- Focal peripheral neurological signs
- Paraesthesia in upper or lower limbs
- Neck pain/tenderness/torticollis
- Dangerous mechanism of injury
 - Fall from significant height
 - Axial load to head
 - High speed motor collision
 - Ejection from motor vehicle
 - Roll over accident
 - Pedestrian/bicycle vs motor vehicle
- Young children at risk of C1-4 injuries without radiological changes (SCIWORA)

Preparation

- Position
 - Flexion may be more dangerous than extension
 - Diaphragmatic breathing easier if patient lies flat
- Prevention of 2° injury
 - Hypotension – Cord ischemia
 - Risk of neurogenic shock
 - Emergency drugs for cardiovascular instability
- Personnel
 - Ensure adequate assistance available
 - FONA (Front of neck access) equipment available

Intubation

- Remove collar and blocks
- Manual in-line stabilisation
- Minimal jaw thrust and chin lift during ventilation
- Consider video laryngoscopy if equipment and skills available

Acute paediatric intubation checklist

How to use the B@EASE Rapid Sequence Induction Checklist

Step ONE: Quick Team Brief at decision to RSI

Minimum of 3 people
 Remember TEAM INTRODUCTIONS

Use the checklist at this point as an aide-memoire to organise the equipment and prepare the patient

Use a reliable source of information for drug doses and intubation guidelines.
 Paediatric drug doses are available on www.crashcall.net
 The Difficult Airway Society produce adult & paediatric airway guidelines

Consider cardiovascular status together with the risk of awareness when choosing an induction agent & dose.

Step TWO: Use the Checklist prior to Induction

When everything is ready, and whilst the patient is being pre-oxygenated, the Team Leader reads the whole checklist out just prior to drug administration

Each box requires an answer, either "Yes/No" or a brief comment

For example:

Q - "2 working Laryngoscopes"
 A - "Yes"
 Q - "Manual In-line Stabilisation Required"
 A - "Not required"
 Q - "Verbalise Drug Doses and Volumes"
 A - "___mg/Kg Induction agent = ___mg = ___mls"
 Q - "Intubator (1st/2nd)"
 A - "Dr X / Dr Y"

Use the aide on the right if necessary to structure "verbalising your plan" for failed ventilation/intubation

Step THREE: After the RSI, consider a team debrief

AIRWAY ASSESSMENT

We do / do not anticipate difficulty in Oxygenation / Intubation

A Senior Anaesthetist is present / available via _____

ENT are present / unavailable / available via _____

PLAN A

The Initial Intubation plan is _____
 Describe the technique you have decided is appropriate & how you will ensure oxygenation is maintained throughout

e.g. Is CPAP needed to adequately pre-oxygenate? Use of Nasal Cannulae?
 Is gentle ventilation before/between attempts acceptable?
 Size & type of laryngoscope, ?bougie, video/fibreoptic technique etc..

PLAN B

If Failure to Intubate, we will ensure Oxygenation and then

WAKE THE PATIENT UP Or _____

e.g. - Site an LMA (or alternate site) & if successful use a secondary intubation technique
 (If having further attempts—discuss how the patient will be kept asleep)

PLAN C

If Failure to oxygenate after PLAN A or PLAN B we will

Prioritise Oxygenation by reverting to a facemask

If Oxygenation is then successful, the plan is to _____

e.g. — Wake-up or use a secondary intubation technique

PLAN D

If Oxygenation is unsuccessful at any point we will declare

CAN'T INTUBATE CAN'T VENTILATE


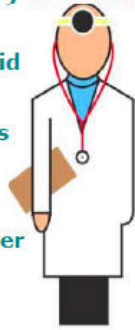

And follow the adult/paediatric CICV guidelines.

If necessary Dr _____ will attempt a cricothyroidotomy using a Cannula/ or a Surgical Technique (state which)

The kit for this is located _____

B@EASE Rapid Sequence Induction Checklist

B @ E A S E

B R I E F	Equipment	Airway/Anaesthesia	Staff	Emergency Plan
	<p>Airway Equipment</p> <ul style="list-style-type: none"> <input type="checkbox"/> Oxygen/ Guedel/ NP airway <input type="checkbox"/> Bag valve Mask & Circuit <ul style="list-style-type: none"> <input type="checkbox"/> (Waters or Ayres T-piece) <input type="checkbox"/> etCO2 attached to HME/Catheter Mt. <ul style="list-style-type: none"> <input type="checkbox"/> (Use during preoxygenation) <input type="checkbox"/> 2 working laryngoscopes & alternate <ul style="list-style-type: none"> <input type="checkbox"/> (McCoy or straight blade) <input type="checkbox"/> Tubes <ul style="list-style-type: none"> <input type="checkbox"/> (2 Adults, 3 Paeds) <input type="checkbox"/> Suction on <input type="checkbox"/> Lubricating Jelly/Bougie/Stylet <input type="checkbox"/> Syringe/Tube fixation <p>Drugs</p> <ul style="list-style-type: none"> <input type="checkbox"/> Induction, Paralysis & Emergency drugs drawn up <input type="checkbox"/> Infusions ready <ul style="list-style-type: none"> <input type="checkbox"/> (Sedation/Inotropes) <p>Monitoring Equipment</p> <ul style="list-style-type: none"> <input type="checkbox"/> etCO2 – waveform seen <input type="checkbox"/> BP – Cycling <input type="checkbox"/> ECG <input type="checkbox"/> SPO2 	<p>Physiology Optimised</p> <ul style="list-style-type: none"> <input type="checkbox"/> IV access location(s) <input type="checkbox"/> Fluid running <input type="checkbox"/> Airway assessed <p>Positioned Appropriately</p> <ul style="list-style-type: none"> <input type="checkbox"/> Bed tips and height adjusted <input type="checkbox"/> Manual In-line Stabilisation required? <input type="checkbox"/> Ear to Sternal notch in horizontal alignment <p>Pharmacology Plan</p> <ul style="list-style-type: none"> <input type="checkbox"/> Drugs checked and labelled <input type="checkbox"/> Verbalise Drug doses (mg/kg) <p><input type="checkbox"/> Difficult airway trolley</p> <p><input type="checkbox"/> Defibrillator location</p>	<p><i>Allocate roles e.g</i></p> <p>Team leader</p> <p>Intubator (1st / 2nd)</p> <p>Airway Assistant</p> <p>Cricoid</p> <p>Drugs</p> <p>Runner</p> 	 <p>Anticipated difficulty?</p> <p>Verbalise Oxygenation/Intubation & Ventilation plans (see overleaf if necessary)</p> <p>Plan A</p> <p>Plan B</p> <p>Plan C</p> <p>Plan D</p> <p>Post Intubation Plan</p> <ul style="list-style-type: none"> <input type="checkbox"/> Ventilator set up checked <input type="checkbox"/> Infusions connected <input type="checkbox"/> CXR requested <input type="checkbox"/> Gastric tube required?

Further help available from Bleeps :

Acute paediatric intubation equipment and physiological parameters reference charts.

Age
Preterm <2k
Preterm 2-4k
Term -3 months
3 m- 1year
1 year
2 year
3 year
4-6 years
6 -8years
>8 years

All sizes and distances are guides and should be confirmed clinically.

All physiological parameters are a guide. The patient should be assessed in the context of suspected or confirmed injuries sustained.

Normal ranges: respiratory rate (RR), heart rate (HR) and blood pressure (BP)							
Age	Guide weight (kg)		RR At rest Breaths per minute 5th-95th centile	HR Beats per minute 5th-95th centile	BP Systolic		
	Boys	Girls			5th centile	50th centile	95th centile
Birth	3.5	3.5	25-50	120-170	65-75	80-90	105
1 month	4.5	4.5					
3 months	6.5	6	25-45	115-160	70-75	85-95	
6 months	8	7					
12 months	9.5	9	20-40	110-160	70-75	85-95	
18 months	11	10					
2 years	12	12	20-30	100-150	70-80	85-100	110
3 years	14	14		90-140			
4 years	16	16		80-135			
5 years	18	18		80-130			
6 years	21	20					
7 years	23	22	15-25	70-120	80-90	90-110	111-120
8 years	25	25					
9 years	28	28					
10 years	31	32					
11 years	35	35					
12 years	43	43	12-24	65-115	90-105	100-120	125-140
14 years	50	50		60-110			
Adult	70	70					

References

The North West and North Wales Transport Service (NWTs)
Advanced Paediatric Life Support. 6th ed. Blackwell Publishing Ltd. 2016.

Guidance for acute paediatric intubation



Difficult direct laryng

Step A Initial tracheal intuba

Direct laryngoscopy – not > 4 attempts
 Check:

- Neck flexion and head extension
- Laryngoscopy technique
- External laryngeal manipulation – r
- Vocal cords open and immobile (ac

If poor view – consider bougie, straight

Failed intubation

Step B Secondary tracheal

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

Failed oxygenation e.g. SpO₂ < 90%

- Convert to face mask
- Optimise head position
- Oxygenate and ventilate
- Ventilate using two person technique (CPAP and oro/nasopharyngeal)
- Manage gastric distension via nasogastric tube
- Reverse non-depolarising muscle relaxants

Following intubation attempts, consider

- Direct/indirect video laryngoscopy should be the default technique for intubation in the AED if familiar with its use.
- 'Wake up patient' may not be a safe option. Consider benefits and risks.
- These guidelines are applicable to children under one-year and over eight-years-old.
- Older children may be suitable for DAS adult guidelines



**Failed intubation
inadequate ventilation**

Step A Continue to attempt

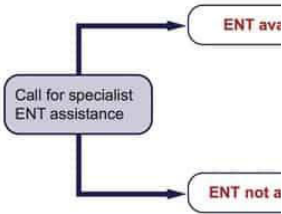
- FIO₂ 1.0
- Optimise head position and chin lift/jaw thrust
- Insert oropharyngeal airway or SAD
- Ventilate using two person bag mask
- Manage gastric distension with an OG tube

Step B Attempt wake up if

If rocuronium or vecuronium used, consider reversal

Prepare for rescue techniques in case of failure

Step C Airway rescue techniques (if oxygen saturations falling) and/or heart rate decreasing



Guidance for a cannot intubate and cannot ventilate situation

- Inform TTL of the situation. Call for an ENT surgeon
- Anaesthetic intervention in children over eight-years-old: Cricothyroid access as 1st line.
- Anaesthetic intervention in children under one-years-old: Tracheal access as 1st line.
- Older children may be suitable for DAS adult CICV guidelines: Scalpel cricothyroidotomy.

*Note: Cricothyroidotomy techniques should only be used in life-threatening situations as a last resort