Clinical Guidance

Paediatric Critical Care: Child Ventilated in Adult ITU

Summary
This guideline is for use when caring for children ventilated in adult ITU. STRS will always endeavour to place a child in a PICU, however this guideline can be used while waiting for STRS or if there was an epidemic. It discusses ventilation, cardiovascular considerations, analgesia/sedation, antibiotics, line insertion and feeding.

Document Detail	
Document type	Clinical Guideline
Document name	Paediatric Critical Care: Child ventilated in adult ICU
Document location	Evelina London website & GSTT Guideline Database
Version	V 3
Effective from	*16th October 2024*
Review date	*31st October 2027*
Owner	PICU, Head of Service
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Approved by, date	Evelina London Clinical Guideline Committee, October 2024
Superseded documents	V 2
Related documents, please use with relevant guidance	Paediatric age & weight based parameters, ETT securing guideline, Intubation ARDS, Sepsis, Neonatal collapse, Peripheral Inotropes
Keywords	Evelina, child, Paediatric, intensive care, STRS, Retrieval, Paediatric critical care, Adult ITU, Ventilate, PICU, resus
Relevant external law, regulation, standards	
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.	

Change History		
Date	Change details, since approval	Approved by
09/2021	Reflect Resus council guidance: Balanced fluids for resus rather than 0.9% sodium chloride, adrenaline rather than dopamine. Reflect updated ARDS, intubation guidance	ELCGC, Oct 2021
09/2024	Added peripheral inotrope hyperlink	ELCGC, Oct 2024

Paediatric Critical Care
Child Ventilated in Adult ICU

Refer all children requiring intensive care to **South Thames Retrieval Service 0207 188 5000**

Lines/ Tubes

- Secure oral or nasal ETT (appropriate size and position) - Intubation Guidance, Paediatric age & weight based parameters, ETT securing guideline
- Always intubate orally in 1st instance and convert to nasal ETT if skill available, as better tolerated
- If high ventilatory pressures (PIP ≥ 25cmH_2O) anticipated (e.g. sepsis, pneumonia) then use cuffed ETT
- Suction catheter = 2x size of ETT e.g. 8Fr catheter fits 4 ETT
- Note there is a higher complication rate of arterial and central line in children.
    - **Indication for (CVL):** if on inotropes or likely to need them
    - **Indications for ART line (not initial priority, avoid brachial):** FiO_2 >60%, ETCO2 >8kPa, on inotropes
- Avoid urinary catheter unless in urinary retention or shock present – weigh nappies and **monitor urine output**

Ventilation

- Pressure control or pressure support ventilation preferred
- Always humidify circuit
- <15kg use small (15mm) diameter ventilator circuit
- Suggested initial ventilator settings:

	PIP	PEEP	Rate	Ti	EtCO2	Sats%
Standard	16-30*	5	15-25	0.7-1sec	4-7kPa	>95%
Asthma	To move chest	5	12-20	1 sec	6-10kPa	>90%
ARDS	To move chest	5-15	15-25	1 sec	6-10kPa	>85%

*PIP initially to achieve chest rise, titrate to EtCO2/ PaCO2 - limit to prevent barotrauma

- Paediatric Acute Respiratory Distress Syndrome managed in similar way to adult ARDS
- If ventilation improves, wean can often be rapid (average paediatric patient ventilated 4 days)

Cardiovascular

- Fluid resuscitation: titrate to heart rate, blood pressure, CVP (if available)
- 1st line: 10mL/kg "balanced" crystalloid**: hartmann's** or **plasmalyte** – 5mL/kg aliquots if cardiac (must reassess)
- 1st line inotrope: **adrenaline 0.05-0.5 micrograms/kg/minute** – can start peripherally
- Central/ peripheral preparations may differ - Emergency drug calculator, Peripheral Inotropes
- All inotropes can be *started* via IO or external jugular line
    - Site CVL at earliest opportunity
- If vasodilated consider **noradrenaline**
- See specific guidance if ongoing shock (e.g. sepsis)

Analgesia and sedation

Essential for ongoing review of pain and need for sedation

- IV **morphine** 10-40 micrograms/kg/h (neonates usually <20)
- Enteral **clonidine** 3-5 micrograms/kg 8 hourly (max starting dose 50 micrograms)
- Add IV **midazolam** 0.5-2microgram/kg/minute only if >5 years and **cardiovascularly stable**
- Muscle relaxation as required with IV **rocuronium** 1mg/kg

If STRS arrival not imminent then more extensive written sedation guidance from Evelina PICU can be sent

Feeding and maintenance fluids

- All children require insertion of NG tube
- Enteral NGT feeding route preferred
- Fluid restrict all critically ill children
- Monitor fluid balance

Fluid requirements (NB. resus fluid is extra to this)

0-9kg	2mL/kg/h total
10kg-40kg	1mL/kg/h total
>40kg	40mL/h max

(E.g. 15kg patient receives 15mL/h)

- Monitor blood glucose - aim glucose 4-8mmol/L
- Use 0.9% sodium chloride & 5% glucose
- Use 0.9% sodium chloride & 10% glucose if neonate or hypoglycaemic
- Use ready-made bags where available

Infection

Admission blood culture, broncho-alveolar lavage, FBC, CRP, nasopharyngeal aspirate

For antibiotic/ antiviral choices discuss with STRS or see specific guideline e.g. sepsis, neonatal collapse

Blood transfusion

Transfuse if:

- Hb <70g/L
- Hb threshold higher if unstable or disease specific e.g. cyanotic cardiac disease Hb <100g/L

- Avoid unnecessary blood sampling, no need for repeated gases if stable- causes significant blood loss

STRS will retrieve all ventilated children ASAP

Children will remain at DGH only in extreme circumstances

Update STRS:

- Clinician feels **patient is deteriorating**
- PIP >25cmH_2O
- Adrenaline or noradrenaline commenced
- Air leak – pneumothorax or pneumomediastinum
- Problems with sedation
- Daily for ongoing support/ advice