Paediatric Critical Care:
Sepsis

Summary
This guideline is for staff to use when treating children with sepsis. It also gives advice on interventions, shock, resuscitation and intubation.

<table>
<thead>
<tr>
<th>Document Detail</th>
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</thead>
<tbody>
<tr>
<td>Document type</td>
</tr>
<tr>
<td>Document name</td>
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<tr>
<td>Document location</td>
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<tr>
<td>Superseded documents</td>
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<tr>
<td>Related documents</td>
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<tr>
<td>Keywords</td>
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<tr>
<td>Relevant external law, regulation, standards</td>
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</tbody>
</table>

Change History

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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.
**Paediatric Critical Care**

**Sepsis (early management)**

Guideline for management of sepsis: patients may have shock +/- meningitis. Focus may be clear (purpura of meningococcal) or occult.

### Initial Intervention
- Intravenous access x 2 quickly. Intraosseous if IV difficult
- Gas, sugar, B/C, FBC, clotting, U&Es, CRP, X match, PCR

### Risk factors and alerts
- Age < 12 months
- Extensive/ rapidly spreading rash (20% with meningococcal sepsis have no rash)
- Recent history of varicella (consider IV aciclovir)/ burns (consider toxic shock)
- Low platelets/ low wbc / coagulopathy: may be normal initially & rapidly change
- Persistent tachycardia despite fluid therapy
- Hypotension is late sign
- Obnubilation and depressed level consciousness

### Initial resuscitation
**Shock**– tachycardia / poor pulses / obtunded / low BP
- High flow O₂. Maintain saturation >95%
- Push 20ml/kg crystalloid bolus and review HR / BP
- Repeat 20ml/kg x 2 crystalloid bolus if no response

### Fluid refractory shock (shock despite >60mls/kg)
- Start peripheral dopamine 10 micrograms/kg/minute
- Titrate to response (max 15 micrograms/kg/min)
- Intubate and ventilate - anticipate decompensation
- Continue fluid resuscitation

### Intubation: other indications
- Hypoxia (sats<92% despite oxygen)
- Altered level of consciousness
- Signs of raised ICP

### INTUBATION
- Early intubation for shock improves outcome
- Most experienced practitioner to intubate
- Induction of anaesthesia may cause cardiovascular instability: consider ketamine, avoid propofol
- NG tube and aspirate stomach
- Pre-oxygenate for 3 minutes
- Ongoing volume resuscitation throughout
- Peripheral dopamine 10 micrograms/kg/minute
- Avoid nasal intubation if coagulopathy or low platelets
- May require high PEEP if pulmonary oedema (cuffed ETT)

### Gain central access (USCG guidance preferable)
- Infuse dopamine centrally
  - If dopamine >10 micrograms/kg/min then add 2nd agent

#### Warm shock
- Wide pulse pressure
- Start noradrenaline 0.1 micrograms/kg/min
  - Titrate to response (max 1 microgram/kg/minute)

#### Cold shock
- Narrow pulse pressure
- Start adrenaline 0.1 micrograms/kg/min
  - Titrate to response (max 1 microgram/kg/minute)

### No or minimal response = catecholamine resistant shock
- Ensure inotropic dose/delivery correct
- Exclude other causes (pericardial effusion, pneumothorax, ongoing blood loss, intracranial bulus)
- Give hydrocortisone IV 2mg/kg bolus

#### Low BP, warm shock
- Add adrenaline

#### Low BP, cold shock
- Maximise adrenaline - consider 3rd agent

### Persistent tachycardia usually = under-resuscitation
- Aggressive reversal of shock improves outcome

### Urgent intervention & reassessment is key
- Exclude cardiac cause (hepatomegaly, cardiomegaly, ECG)
- Indwelling line/VP shunt=potential focus- add IV vancomycin

### Features of Toxic shock- add IV clindamycin
- DO NOT PERFORM LUMBAR PUNCTURE 6

### Depressed level of consciousness (LOC)
- Differential: shock, meningitis, raised ICP
  - Treat seizures (phenytoin). Correct hypotraemia and low sugar
- Raised ICP: relative bradycardia, posturing/seizures, abnormal pupils - may mask shock with relative bradycardia/ hypertension
- Give osmotherapy: 3% sodium chloride 3-5 ml/kg IV
- Impending herniation: hyperventilate, give further 3 ml/kg 3% sodium chloride.
- Consider steroids if <12hours since first antibiotics and clinical signs of bacterial meningitis 7 (Dexamethasone 0.15mg/kg IV, max 10mg QDS x 4 days)

### Ongoing support
- Ventilation: may need to ↑PEEP if pulmonary oedema/ poor oxygenation
- Monitor central temp, invasive BP, CVP, ABG & central venous sats
- Ongoing large volume resuscitation often required in addition to inotropes
- Consider milrinone if cold shock
- Optimise haemoglobin (maintain Hb > 100g/l; oxygen delivery) and correct clotting abnormalities
- Consider cooling if pyrexia causing compromise to 36-37°C, surface cooling or cold fluid (boluses can be cooled to 4°C - produces rapid cooling)
- Observe urine output/electrolytes and correct abnormalities. Check CK.
  - May require urgent CVH on arrival on unit
- Exclude other sites of infection (e.g. necrotising fasciitis)
- At risk of pressure sores-consider Hunteleigh mattress on admission
- Consider immunoglobulin (IVlg) in toxic shock
- Liaise with ID if concerns regarding Abx resistance or rationalisation

### Public Health
- Refer to website (see below) regarding notifiable diseases 8 and prophylaxis
- Common notifiable diseases: invasive group A Strep, meningococcal, acute meningitis/encephalitis
- Prophylaxis if meningococcal probable:
  - Household contacts
  - Health workers exposed to resp secretions in first 24 h of treatment
  - Treat with oral ciprofloxacin (all ages and in pregnancy)
  - If meningococcal, patient no longer infectious after 24 h of treatment 9

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DTC Reference: 181051a

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