Paediatric 6 year old sepsis management scenario

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Description

6 year old presenting generally unwell to ED brought in by parent. Has been back and forward to GP and Walk in Centre over the last week. Now tachycardic and hypovolaemic with pyrexia of 39 and is obviously septic. The patient will continue to deteriorate, needing advanced airway management and intubation due to reducing GCS and fluid requirements. Patient has fluid resistant shock, so will need inotropic support following initial fluid resuscitation.
The Emergency department team should escalate treatment early, both within the hospital to anaesthetics/ITU and to their local PICU/paediatric retrieval service.

Learner Group Needs and Assessment

Learner Group	Learner Needs
Triage nurse	Ato E triage assessment Recognition of septic child Appropriate escalation and triage score Knowledge of paediatric sepsis 6 screening tool
Nurse in charge/ shift coordinator	Recognition of sick child Appropriate allocation to area (resus) Escalation and handover
Paediatric team	Assessment and management of septic child Stabilisation Arranging transfer to PICU
Senior ED medic	Initial assessment and management Referral to Paeds Referral to anaesthetics Referral to PICU
Resuscitation nurses	Sepsis 6 Observations Fluids Antibiotic preparation

Learning Objectives and Delivery Methods

Objective Type	Description	Delivery Method(s)
Nursing	See learner needs As stand alone sim not needing elearning and classroom but for transport course development lectures/pre reading	E-Learning; Classroom; Simulation; Point of Care
Medical	See learning needs above	E-Learning; Classroom; Simulation; Point of Care

Faculty Script

Oliver Smith, a 6 year old boy presents to ED referred by GP with 1/52 history of generally unwell, now drowsy, febrile, vomiting ?Gastroeneteritis. Accompanied by mum

PMH NKDA, imms UTD

Now tachycardic and hypovolaemic with pyrexia of 39 and is obviously septic. The patient will continue to deteriorate, needing advanced airway management and intubation due to reducing GCS and fluid requirements. Patient has fluid resistant shock, so will need inotropic support following initial fluid resuscitation.

The Emergency department team should escalate treatment early, both within the hospital to anaesthetics/ITU and to their local PICU/paediatric retrieval service.

When rash is found, confirm type

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Scenario State 1

Initial presentation
(Transition=Fluid boluses given)

Physiological Trends

As O2 given, increase O2 sats to 94 If IV fluid bolus given, transient improvement in BP before progression state

Expected Outcomes

Participants should	Facilitators should
Recognise acute deterioration and consider differential diagnoses including Sepsis 6 Recognise signs of shock – hypotension, tachycardia, altered level of consciousness Administer high flow oxygen by non-breathe mask Obtain intravenous access and if not successful progress to io insertion Request bloods including venous blood gas, FBC, U&Es, CRP, LFTS, Blood culture Administer a fluid bolus 20mls/kg 0.9% saline and repeat as needed Administer IV antibiotics Consider the use of early inotropes Consider early escalation of care and retrieval	Once fluid bolus given, move to prgression state; if fluid boluses not given, or inadequate fluid given, prgress to deterioration.

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Scenario State 2

Progression - Fluid Boluses Given (Transition=inotropic support initiated)

Physiological Trends

Transient increases in BP (systolic) but fluid-refractory shock is present Inotropic support is required to stabilise patient remains stable throughout intubation if appropriate oxygenation and fluid resuscitation have been given

Expected Outcomes

Participants should	Facilitators should
• Identify fluid resistant shock and the need for further fluid resuscitation with 0.9% saline, 4.5% albumin or packed red blood cells • Identify the need for inotropic support and initiate dopamine centrally via the interosseous access route • Insert a second interosseous line or establish central access and continue fluid resuscitation • Recognise the need for intubation • Prepare and plan for intubation including the consideration of the risks of hypotension on induction of anaesthesia • Avoid the use of propofol and ensure inotropic support prior to intubation to prevent hypotension and decompensation • Continue aggressive fluid resuscitation • Recognise DIC, hypoglycaemia and development of multiorgan failure • Correct hypoglycaemia with dextrose bolus • Request urgent blood products including packed red cells, fresh frozen plasma and cryoprecipitate • Recognise the need for transfer to PICU and coordinate this by contacting the retrieval team.	Observe candidates' management and choose further progression state.

Scenario State 3

Progression - Post inotropic support and intubation (Transition=Discussion with the retrieval team)

Physiological Trends

oxygenation post-intubation remains stable with safe management of ETT titration of inotropes should be considered along with additional fluid boluses

Expected Outcomes

Participants should	Facilitators should
• Arrange a retrieval to PICU • Consider post stabilisation care including normocapnoea, normoglycaemia, haemodynamic support with inotropes to maintain blood pressure, thermoregulation, correct of coagulopathy with blood products. • Consider meningococcal prophylaxis for contacts including healthcare professionals and family members • Prepare for sudden deterioration and possible cardiac arrest	Prepare to finish scenario and transition to the debrief.

Scenario State 4

Deterioration - if fluid boluses not given > 40mls/kg or inotropes not commenced
(Transition=)

Physiological Trends

progressive tachycardia and hypotension further desaturation

Expected Outcomes

Participants should	Facilitators should
• Recognise peri-arrest state and prepare cardiac arrest medication • Recognise the need to commence aggressive fluid resuscitation and commence inotropic support • Escalate for more help	Facilitators may stop/pause the scenario if they feel the candidates are struggling/have misdiagnosed to ensure the learning outcomes are covered

Debriefing Discussion Points

Clinical Management

-Prioritisation of treatment of septic child

-Understand the risks of procedures such as Lumbar Puncture in septic children (this should not be performed)

- Understand the risks associated with intubation i.e. worsening hypotension and the need to avoid propofol for induction. More advisable to optimise pre-load and commence inotropes before intubation

- Discussion of the need for intubation even in a child without decreasing GCS: optimise oxygen delivery, increases myocardial perfusion and oxygenation, prevents secondary damage and promotes end organ perfusion

-Other presentations - rash

-Early anticipation of fluid refractory shock and need for inotropic support

- Understand the need for aggressive fluid resuscitation > 40mls/kg even in the absence of intubation (risk of pulmonary oedema minimal)

-consideration of which inotrope to use i.e. adrenaline for cold shock and noradrenaline for warm shock

-Early administration of oxygen, given if saturations are not low. Consider how to optimise oxygen delivery in shock.

-Need to assess GCS within the context of shock as an indicator of perfusion pressure

-Early anticipation of complications of meningococcal septic shock including:

1. Cardiovascular instability and collapse
2. Coagulopathy
3. Hypoglycaemia
4. Fluid resistanance and need for early inotropes

-The importance of the golden hour in the resuscitation of septic shock and the goals including:

1. Normal perfusion
2. Warm extremities
3. Capillary refill time < 3 secs
4. Normal range for age HR, BP, RR
5. Normal mental status
6. Urine output > 1ml/kg/hr
7. Lactate < 2

CRM and Human Factors

-Escalation/Calling for help early both within and external to the local department and organisation

-Recognition of what is going on and when child is deteriorating further (situational awareness)

-Clarity of roles in peri-arrest situation

-Use of closed-loop communication especially for high priority treatments: antibiotics given, fluids given (amount), anaesthetics called, transport teams contacted

-Use of resources available both internal and external to the local department and organisation (paediatric staff in hospital, anaesthetics, transport teams and their published resources)

-Complexities around managing the sepsis and shock whilst also recognising and treating secondary outcomes including hypoglycaemia, reducing GCS, Coagulopathy

Prompts for discussion of human factors:

- Know the environment

- Anticipate and Plan

- Call for help

- Exercise leadership and followership

- Distribute the workload

- Mobilize all available resources

- Communicate effectively

- Use all available information

- Prevent and Manage fixation errors

- Double check everything

- Use cognitive aids

- Re-evaluate repeatedly

- Use good teamwork

- Allocate attention wisely