The Febrile Child & The Septic Child part 2

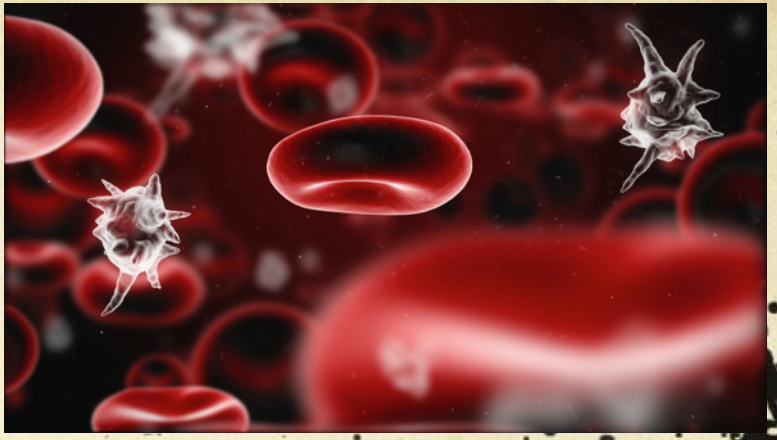
RCH Febrile child

RCH sepsis

Part 2: The septic child

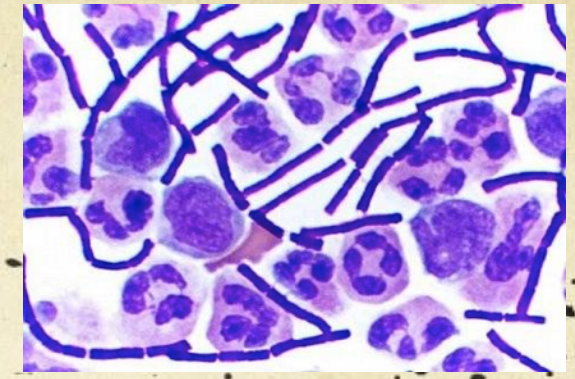
RCH Sepsis

What is sepsis?



Sepsis is a potentially life-threatening complication of an infection.

Sepsis occurs when chemicals released into the bloodstream to fight the infection trigger inflammatory responses throughout the body.



What is septic shock?

Septic Shock

Septic shock is a serious medical condition that occurs when sepsis leads to dangerously **low blood pressure** and **abnormalities in cellular metabolism.**

What are the features and causes of :

- “cold shock”?
- “warm shock”?

This may change during resus

COLD SHOCK

- Cool peripheries
  - Core/ periphery temp difference
- Increased CRT
- Tachycardia/ tachypnoea
- Narrow pulse pressure
- Causes:
  - sepsis

WARM SHOCK

- Warm peripheries
- Reduced CRT
- achycardiac/ tachypnoea
- Widening pulse pressure
- Causes:
  - Toxic shock
  - Anaphylaxis
  - Neurogenic shock
  - Cardiogenic shock

Which categories of patients are at increased risk of sepsis?

High risk groups:

- Immunocompromised
- Neonates (<28 days) esp premature infants
- Indwelling catheter/ port/ central venous access

Recognition is key..

http://survivesepsis.org/the-sepsis-six/

Aim to assess and treat sepsis quickly

Time to antibiotics should be < 60 minutes

Time = 0 min

RECOGNITION – link to normal values

Fever or hypothermia
Tachycardia
Hypotension
Warm shock – wide pulse pressure, rapid capillary refill
Cold shock – narrow pulse pressure, prolonged capillary refill
Tachypnoea +/- hypoxia
Altered conscious state
Unwell appearance

Call for help from experienced clinician
Apply oxygen 8L/min via face mask
(→Resuscitation guideline)
Continuous cardiorespiratory monitoring

Normal values

Age	Min sys BP (mmHg)	HR (bpm)	RR (bpm)
Term	50	100 - 170	40 - 60
3m	50	100 - 170	30 - 50
6m	60	100 - 170	30 - 50
1y	65	100 - 170	30 - 40
2y	65	100 - 160	20 - 30
4y	70	80 - 130	20
6y	75	70 - 115	16
8y	80	70 - 110	16
10y	85	60 - 105	16
12y	90	60 - 100	16
14y	90	60 - 100	16
17+y	90	60 - 100	16

Time < 15 mins

IV ACCESS

If no IV access within 15 minutes insert IO
Take BC, venous gas and blood glucose (if easy bleed consider FBC, UEC, coags). Do NOT delay other therapy to take blood tests.
Lactate >4 mmol/L is a sign of severe illness

Time < 30 mins

ANTIBIOTICS

Give initial antibiotics on cannulation as a push

- Age < 1 month – Cefotaxime iv 50mg/kg + Benzylpenicillin iv 60mg/kg
- Age ≥ 1 month – Cefotaxime iv 50mg/kg OR Ceftriaxone iv 50mg/kg (2g) + Flucloxacillin iv 50mg/kg (2g)

→ Antibiotics guideline, Febrile neutropenia guideline

If no IV/IO access within 30 minutes:

- give IM Ceftriaxone 50mg/kg and seek assistance in obtaining IV access
- Once IV access is obtained immediately give full IV antibiotic doses as listed above

IV FLUID

Give initial 20ml/kg of Normal Saline **as a push** over a maximum of 10 minutes (not through an infusion pump)
Monitor for improvement in vital signs / conscious state
If only transient improvement occurs, consider additional fluid boluses to a maximum total volume of 40ml/kg
Total volumes >40ml/kg should be discussed with senior clinician

Time < 60 mins

INOTROPE

- If no improvement in vital signs/conscious state occurs after fluid bolusing correct hypogcalcaemia and consider:
  - Noradrenaline for warm shock
  - Dobutamine for cold shock (→ drug doses)
- Inotropes can be given via a peripheral IV. A central line is not required at this stage.
- Contact Sick Kids Hotline (03)9345 7007 if inotropes are required

VENTILATORY SUPPORT

- For respiratory distress/hypoxia in a patient with *normal* conscious state consider non-invasive ventilation
- For respiratory distress/hypoxia in a patient with *altered* conscious state consider intubation/ventilation.

FURTHER MANAGEMENT

- If initial lactate >4mmol/dL it should be repeated after ~2 hours of resuscitation. Lactate clearance of >10% should be targeted.
- Correct hypocalcaemia.
- Monitor BSL.
- Secondary resuscitation measures including second inotrope, steroids, haemofiltration, and ECMO should be discussed.

See also

- RCH emergency drug doses
- RCH Antibiotic guideline
- RCH Febrile neutropenia
- RCH meningitis
- RCH Kawasaki

Case 1

- A previously well 8 year old girl called Manisha developed a widespread blanching macular erythematous rash and fever. After 24 hours she became progressively drowsy and was admitted to hospital.

- *What else do you want to know?*
- *What is your differential?*

- On examination she has a respiratory rate of 35 with no recession, a pulse of 140 with warm peripheries and cap refill of 3 seconds centrally, she responds to voice. Her temperature was 39.5°C. She has a widespread blanching rash and normal heart sounds, clear chest and abdomen, ENT and joints

- *What is your interpretation of her examination findings?*
- *What other examination findings would you like?*
- *What is your differential diagnosis?*
- *What is your management plan?*

Further information

- The child has watery diarrhoea.
- Her lips and tongue are noted to be red. There is an abrasion on the right thigh following a fall from her bicycle 4 days previously.
- She has no neck stiffness but her lethargy stops you checking if she has photophobia
- Her BP is 90/30

Differential and management

- Sepsis with warm shock – likely Toxic shock syndrome
- Early call for senior input/ Paed response
- ABCDEFG approach
- Active airway management ? Early intubation if GCS<8/15
- Iv access, bloods (including BC) and fluids and antibiotics (ceftraixone and flucloxacillin)
- Discussion with PIPER
- Consider need for inotropes

Case 2

- Thomas is an 18 month old boy who presents to ED with Fever for 1 day, coryza and reduced oral intake.
- In ED, temp 37.8, RR 35, HR 100, sats 99%, he is climbing on to the furniture and playing with his mother's phone
- He is sent home by the ED intern with a diagnosis of URTI
- *What else do you want to know in the history? (and therefore document)*
- *What else would you want to know on examination?*
- *Are you happy with the resident's plan?*

- Thomas returns 2 days later with ongoing fever, coryza and reduced oral intake.
- His mother tells you his temp has not been below 38 for 24 hours (axillary thermometer)
- His obs: temp 38.5, RR 35, HR 140, sats 99%, he is quiet and sitting on his mother's lap and appears miserable.
- He is sent home by the ED intern after tolerating an icypole
- *What else do you want to know on history and examination?*
- *Are you happy with the intern's plan of action?*

- Thomas returns 3 days later, his fever has continued, he is lethargic, has not eaten for the last 24 hours and had only 1 wet nappy. He responds to voice but is irritable
- He dislikes any contact and is miserable when the lights are turned on
- *What else do you want to know on history and examination?*
- *What is your differential diagnosis?*
- *What should be the management?*

- Thomas was suspected to have meningitis/ sepsis
- He had a full septic screen
- LP confirmed pneumococcal meningitis
- He received cefatriaxone and dexamethasone

- *What do you think about this management plan?*
- *Was he treated appropriately at his earlier presentations?*

Check your answers:

- RCH meningoenephalitis
- RCH fluids in meningitis
- RCH febrile child