

MENINGOCOCCAL SEPTICAEMIA

- *Refer to the www.meningitis.org management pathway*

Presentation

Features include fever, myalgia, rigors and confusion. By contrast with neurological features seen in meningitis, those with septicaemia usually have a clear sensorium. Early on clinical features are fever, toxic appearance and tachycardia. With progression, features alter to circulatory failure and shock with poor peripheral perfusion and the gap between core and peripheral temperature increases. Oliguria/anuria may develop and lethargy and confusion leading to coma may result as cerebral perfusion diminishes.

Please note that hypotension is not a feature of shock in children until a pre-terminal stage is reached, even in the face of significant reduction in circulating volume.

This is a most fulminant infection. Some children may be symptomatic for several days, others die in <12 hours from the onset of first symptom. Pharyngitis may precede onset in some but others simply get ill and hot. Early recognition is the key to success with requires careful examination of febrile children in a good light, looking for evidence of a purpuric rash in those who are more ill. About 10% of patients develop an initial maculopapular rash (blanches on pressure) prior to the onset of purpura (will not blanch on pressure); in others no rash is present, however, look at the conjunctivae since one purpuric spot in an ill, febrile child is enough to begin therapy.

Management

Suspicion goes more than 50% of the way towards actual diagnosis.

- Assess ABC and treat. Get senior help early
- Administer IV ceftriaxone 80mg/kg– (max 2-4g, over 2-4min). Add in ampicillin /amoxicillin 100mg/kg IV in the under 6 months to cover Neisseria.

The meningococcal packs are in the paediatric resus area, please complete before antibiotics if it will not unduly delay administration of the antibiotic.

RASHES

- Children with non-blanching rash and sick septic children with non-specific rashes should be treated for meningococcal disease.
- Discharge plans for children with rashes must include Glass Test Advice

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Colour textbooks are invaluable

Key Facts are given in the table below

<u>Condition</u>	<u>Organism</u>	<u>Clinical Presentation</u>	<u>Treatment</u>
<u>Impetigo</u>	<u>Group A Strep</u>	<u>Vesicles becoming unroofed Honey crust</u>	<u>Polyfax Fucidin Ointment (Oral Flucloxacillin)</u>
<u>Mild Cellulitis</u>	<u>Strep or Staph</u>	<u>Warm, red, swelling</u>	<u>Co-Amoxiclav</u>
<u>Severe cellulitis</u>	<u>Strep or Staph</u>	<u>Above + Systemic illness or periorbital involvement</u>	<u>ADMIT FOR IV TREATMENT OR IV NURSES</u>
<u>Erythema Multiforme</u>		<u>Target lesions incl. Palms & sole</u>	<u>Supportive</u>
<u>Stevens Johnson Syndrome</u>		<u>Above + mucous membrane</u>	<u>ADMIT</u>
<u>Urticaria</u>	<u>Allergic Reaction</u>	<u>"Hives" or nettle rash</u>	<u>1% HC cream</u>
<u>Drug Eruption</u>		<u>Any rash + drug Hx</u>	
<u>Scabies</u>	<u>Scaroptes scabiei</u>	<u>Papules or nodules esp flexor creases Burrows between fingers</u>	<u>Malathion or Permethrin +Advice sheet from CI Derm Ill.</u>
<u>Fifth Disease</u>	<u>Parvovirus</u>	<u>Slapped Cheek</u>	
<u>Kawasaki Syndrome</u>		<u>Erythema, sick, conjunctivitis, mucositis, peeling from fingers or toes</u>	<u>ADMIT</u>
<u>Toxic Shock Syndrome</u>	<u>Staph</u>	<u>Erythema, watery diarrhoea, shock</u>	<u>Flucloxacillin</u>

Condition	Organism	Clinical Presentation	Treatment
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PAEDIATRIC INFECTIOUS DISEASES

<u>Scarlet fever</u>	<u>Group A Strep</u>	<u>Erythema, strawberry tongue</u>	<u>Penicillin</u>
<u>Viral Exanthem</u>		<u>Pin prick rash or pimples. URTI or vague illness.</u>	
<u>Chickenpox</u>	<u>Varicella Zoster</u>	<u>Vesicles on trunk</u>	<u>Risk to pregnant mums- refer to GP for serology/immunisation</u>
<u>Primary Herpes Stomatitis</u>	<u>H. Simplex</u>	<u>Extensive oral ulcers</u>	<u>Acyclovir Mouthwash</u>
<u>Post-primary HSV</u>	<u>h. Simplex</u>	<u>Cold sores, lip ulcers</u>	<u>Acyclovir Mouthwash</u>
<u>NAI</u>		<u>Bizarre marks, burns</u>	<u>Child protection guidelines</u>
<u>Meningococcal</u>		<u>Non-blanching rash</u> <u>May be extremely subtle at first</u>	<u>IMMEDIATE TREATMENT OR SENIOR OPINION FOR ALL NON-BLANCHING RASHES</u>

ASSESSING PYREXIA IN CHILDREN (SEE ABC SERIOUSLY ILL CHILD, TRIAGE, VOMITING AND DIARRHOEA)

- “Time and observations sometimes help the art of medicine..”
- Unwell pyrexia children must be taken to resus immediately – the paediatric registrar must be contacted and you should follow the septic child protocol.

High temperatures are very common in childhood and you are going to see lots of cases while working in the Emergency Department. The parental concern is always meningitis – this should be your main concern as well! Although all children should be seen very promptly there is no rush if your initial assessment excludes serious illness. It is a good idea to keep the child in the department for an hour or two if discharge is a possibility but you are not sure. You can tell the child’s parents that you are going to keep him/her in the Emergency Department for a period of observation.

Initial Action

- The child should have been given an antipyretic by the triage nurse. Make sure that their clothes are removed and that they are cooling down.
- Consider acetaminophen in all pyrexial / unwell children at triage in case venepuncture is required. Especially all infants under 90 days with temps
- Talk to the child’s parents and listen to what they tell you.
- Carry out a full top-to-toe examination including assessment of general appearance, cardiorespiratory exam, abdominal exam, rashes and ENT examination.
- If no obvious cause for the fever is found urinalysis must be carried out and a specimen sent to the lab for direct microscopy. Chest X-ray should be considered and is mandatory if there is any abnormality of respiratory rate or SaO₂.

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Admitting or discharging

- Less than 28 days old – admission is always mandatory.
- 28 days to 90 days – discuss with ED consultant or paediatric reg
- Older than 90 days – assessment becomes more reliable so children older than three months may be discharged by the Emergency Department doctors if well. A senior ED doctor must sign off all pyrexial children under 1 year old.

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VOMITING AND DIARRHOEA – THE DEHYDRATED CHILD (SEE SERIOUSLY ILL CHILD, TRIAGE, ASSESSING PYREXIA)

- Very ill children should be taken to resuscitation immediately and paediatric registrar contacted.
- The main aim with diarrhoea and vomiting in children is to determine the child's hydration status and stabilise. The underlying cause should then be sought.

The most common cause is acute gastro-enteritis (which is usually viral) but systemic bacterial infection may also be present in this way. In very young children, vomiting is due to faulty feeding, over feeding, regurgitation (GOR) or an obstructive lesion (pyloric stenosis, malrotation). Don't forget that intussusception causes colic, pale/screaming attacks and diarrhoea/blood PR – an abdominal X-ray should be taken if this is suspected.

Action

- Give dioralyte 5mls every 5 mins, get parents to chart amount taken (this will hopefully have been started by the triage nurse)
- Take a good history, in particular, the number of wet nappies, tears, timing of vomiting, contents of vomiting and type of vomiting (projectile) and number of dirty nappies. Listen to parents (unfortunately this may mean looking at a dirty nappy that has been specially saved for you!).
- On examination note mental status, mucous membrane, tears and capillary refill.
- Carry out a good examination, as you would for a pyrexia child, remembering urine test.
- Following your history and examination, decide if dehydration is - mild (3%), moderate (5%) severe (8%).
- For mild dehydration try a small bottle of dioralyte (if not already tried). Child can be discharged home if tolerating this and remains well after a period of observation.
- Moderate to severe dehydration will need admission for parenteral fluids. Contact the Paediatric team who will calculate fluid replacement.
- Admit all children who are not feeding / tolerating oral fluids

Advise parents

- Clear fluids only – regularly and small amounts.
- Dioralyte.
- Advance to simple foods as tolerated.
- Do not give milk (cow) or fruit juices.
- Give simple advice about preventing faecal-oral spread of infection.

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- To come again SOS if:
 - diarrhoea and vomiting continues after 24 hours
 - blood in stool or vomit signs of dehydration develop.

Assessment of Dehydration Levels in Infants

Signs	Severity		
	Mild	Moderate	Severe
General condition	Thirsty, restless, agitated	Thirsty, restless, irritable	Withdrawn, somnolent, or comatose; rapid deep breathing
Pulse	Normal	Rapid, weak	Rapid, weak
Anterior fontanelle	Normal	Sunken	Very sunken
Eyes	Normal	Sunken	Very sunken
Tears	Present	Absent	Absent
Mucous membranes	Slightly dry	Dry	Dry
Skin turgor	Normal	Decreased	Decreased with tenting
Urine	Normal	Reduced, concentrated	None for several hours
Weight loss	4%-5%	6%-9%	>10%

Intravenous fluids

IV Fluids must be prescribed on a Paediatric Fluid Balance Chart

ED medical staff should only prescribe and administer fluid boluses for shocked children and dextrose for hypoglycaemic children.

Fluids or maintenance and on-going losses must only be prescribed by the inpatient paediatric medical team.

See next page for further guidance.

PARENTERAL FLUID THERAPY (1 month - 16 yrs)

Initial management guideline for previously well children

Monitoring & observations essential

All children
Admission Weight.
12 Hourly – Assess In/ Out put, glucose
Daily – Clinical reassessment. U&E initially (more often if a result abnormal).

ILL children
May need:
Hourly - HR, RR, BP, GCS.
Fluid In/ Out put (urine osmolality if volume cannot be measured)
2-4 Hourly – glucose, U&E, +/- blood gas.
Daily - weight

Each shift
Handover and review of fluid management plan.

If plasma Na⁺ <130mmol/l
ask for senior help

Is shock present?

YES

Rapid Fluid bolus
10ml/kg 0.9% Sodium Chloride IV or IO
Reassess.
Repeat three times if needed while calling for senior help.
(Up to 60 ml/kg may be needed. Use blood after 40ml/kg in haemorrhage)

Can child be managed with oral fluids?

YES

Prescribe oral fluids

Is there a fluid deficit?

YES

Estimate & replace deficit

(% dehydration x kg x 10 = fluid deficit) mls of 0.9% Sodium Chloride or Compound Sodium Lactate
Subtract volume of fluid bolus from this calculated deficit

Calculate & prescribe this residual deficit separately from maintenance.
Give over 24 hours
(or over 48 hours if Na⁺ <135 or >145 mmol/l)

Calculate ongoing losses at least 4 hourly & prescribe the replacement separately.

Be prepared to change fluid according to clinical reassessment and test results

****DKA/burns/renal/ cardiac patient? - Refer to appropriate protocol**

Prescribe maintenance fluids

INITIAL choice of IV maintenance fluid

Patients at particular risk of Hyponatraemia.
(includes peri-operative patients; patients with head injuries; CNS infection; severe sepsis; hypotension; intravascular volume depletion; bronchiolitis; low plasma Sodium, particularly if less than 135mmol/l).

Fluid:
0.9% Sodium Chloride or Compound Sodium Lactate or 0.9% Sodium Chloride with 5% Glucose

Other patients
0.45% Sodium Chloride with either 2.5% or 5% Glucose

All patients
Change fluid rate according to clinical assessment and change electrolyte and glucose content according to test results.
Commence oral fluids as soon as possible.

Calculation of 100% maintenance rate

1st 10 kg = 4ml/kg/hr
2nd 10 kg = 2ml/kg/hr
subseq kg = 1ml/kg/hr

max 2 litres per 24 hours in females
max 2.5 litres per 24 hours in males

If risk of hyponatraemia is high consider initially reducing maintenance volume to two thirds of maintenance

IV Maintenance K⁺ normally required after 24 hrs (be aware of potential for K⁺ deficit at presentation e.g. pyloric stenosis).
Replace ongoing losses with the same volume of either 0.9% Sodium Chloride or Compound Sodium Lactate.
Oral intake must be considered in the fluid prescription calculation.
Medications: volumes of drug infusions and oral medications must be considered in the fluid prescription.
Hypoglycaemia (<3mmol/l): give 5ml/kg bolus of 10% Glucose. Recheck after 15-30 mins; change maintenance fluid.
Symptomatic Hyponatraemia: features include nausea, vomiting, headache, irritability, altered level of consciousness, seizure, apnoea.