

WOMEN'S HEALTH AND PAEDIATRICS
 PAEDIATRIC DEPT

Guidelines for the Management of Meningococcal Septicaemia

Amendments			
Date	Page(s)	Comments	Approved by
October 2014	New Guideline		
March 2018		Whole document review	Paediatric Guideline Group

Compiled by: Paediatric Consultants

In Consultation with:

Ratified by: Paediatric Guidelines Group

Date Ratified: October 2014

Date Reviewed: March 2018

Next Review Date: March 2021

Target Audience: Doctors, nurses and support staff working in Paediatrics

Impact Assessment Carried Out By:

Comment on this document to: Dr Bhatti and Dr Baksh Consultant Paediatrician

Please note these are guidelines only and it will be the clinician's discretion to apply different treatment depending on individual circumstance of patient.

A MEDICAL EMERGENCY!

INFORMATION FOR G.P. CALLS

For meningococcal disease give a single IV or IM dose of:

- BENZYL PENICILLIN < 1 year 300 mg; 1 – 9 years 600 mg; > 9 year 1200 mg
or
 - CEFOTAXIME 50 mg/kg under 12 years, 1 Gram over 12 years of age
- Arrange urgent transfer to hospital

INITIAL MANAGEMENT IN HIGH DEPENDENCY BED

- CALL FOR HELP – Paediatric Registrar – Anaesthetist – Nurse
- AIRWAY
- BREATHING
- CIRCULATION

AIRWAY – is airway protection required?

BREATHING 100% oxygen
15 litres facemask Oxygen via facial rebreathing mask

Saturation monitor

Consider ventilation if:

- Exhausted
- G.C.S. less than 8
- Fluid requirement > 40 ml/kg
- Unprotected airway

CIRCULATION

- IV access (x 2 if possible)
- IO access if IV access not immediately secured (3 attempts or 90 seconds)
- Take bloods (see below)
- Cardiac Monitor
- Assess circulation BP/pulse/capillary refill

1st FLUID BOLUS 20 ml/kg (0.9% Sodium Chloride)

If signs of shock persist, immediately give 2nd bolus 0.9% Sodium Chloride or 4.5% human albumin solution.

If still persists, give a third bolus of 20ml/kg 0.9% Sodium Chloride or 4.5% human albumin solution and call for anaesthetic assistance for urgent intubation and ventilation and inform STRS.

Start treatment with vaso active drugs. Consider giving a further fluid bolus 0.9% Sodium Chloride or 4.5% human albumin solution 20ml/kg.

DRUGS (within 1 hour of arrival)

Antibiotics for suspected bacterial meningitis or meningococcal disease

- Treat children and young people aged 3 months or older with suspected bacterial meningitis without delay using intravenous ceftriaxone.
- Treat children younger than 3 months with suspected bacterial meningitis without delay using intravenous cefotaxime plus either amoxicillin or ampicillin.
- Treat suspected meningococcal disease without delay using intravenous ceftriaxone.
- Where ceftriaxone is used, do not administer it at the same time as calcium-containing infusions. Instead, use cefotaxime
- In children younger than 3 months, ceftriaxone may be used as an alternative to cefotaxime (with or without ampicillin or amoxicillin), but be aware that ceftriaxone should not be used in premature babies or in babies with jaundice, hypoalbuminaemia or acidosis as it may exacerbate hyperbilirubinaemia.

Meningococcal disease

- In children and young people with confirmed meningococcal disease, treat with intravenous ceftriaxone for 7 days in total unless directed otherwise by the results of antibiotic sensitivities.
- In children and young people with unconfirmed but clinically suspected meningococcal disease, treat with intravenous ceftriaxone for 7 days in total.

Penicillin allergy is not a contra-indication for cephalosporin use in this situation.

REASSESS A/B/C

Look especially at pulse/capillary refill (normal cap. Refill is < 2 seconds)

INVESTIGATIONS

- Bloods: FBC, Clotting, Group and Save
- U + E, LFT, Mg, Ca Glucose, CRP, lactate
- Blood Culture, meningococcal PCR (EDTA)
- Blood Gas including lactate
- BM stix
- Micro: THROAT SWAB, Urine Culture
- Imaging: Chest X-ray post intubation
- **DO NOT DO A LUMBAR PUNCTURE**

CONTINUED MANAGEMENT

Telephone South Thames Retrieval Service for children 020 7188 5000 in all cases.
Inform Consultant in charge in all cases.

TALK TO PARENTS

- Very important but not at expense of the resuscitation
- ? Do they want to sit with their child during resuscitation
- Explain diagnosis
- Take a history, contacts etc.

REASSESS CIRCULATION REGULARLY (to include middle grade doctor regular review)

- Measure capillary refill time and pulse frequently
- Treat shock early with fluid boluses and inotropes and consider intubation when child receives over 40-60 mls/kg of fluid bolus.
- May need continued fluid replacement
- May need inotropes
- **HYPOTENSION IS A LATE SIGN!**

- Dobutamine/Dopamine may be given diluted via peripheral line (10 – 20 mcg/kg/min). If given peripherally dopamine maximum concentration 1.6 mg/ml, dobutamine 5 mg/ml.
- Consider adrenaline/noradrenaline once central venous access gained. Dose 0.1 mcg/kg/min.
- If no or minimal response to catecholamines consider hydrocortisone 2 mg/ kg bolus.
- If poor response continues discuss with PICU about using low dose corticosteroids (hydrocortisone 25 mg/m square four times a day)

Chase urgent bloods and repeat if necessary at frequent intervals.

CORRECT ELECTROLYTE DISTURBANCE

- POTASSIUM < 3.5 mmol/l give 0.25 mmol/kg KCl over 1 hour IV. Dilute before use, see below. Caution if anuric
- CALCIUM (ionized) < 1.0 mmol/l give 0.1 ml/kg 10% CaCl over 30 minutes IV Alternative 0.3 ml/kg of calcium gluconate 10% (0.22 mmol/ml) over 30 min. Maximum 20 mls. Calcium gluconate is preferred for maintenance supplementation
- MAGNESIUM < 0.7 mmol/l give 0.2 mls/kg 50% MgSO4 over 30 minutes IV. If given peripherally dilute to 10% solution (100 mg/ml) and give 1 ml/kg
- PHOSPHATE < 0.7 give 0.2 mmol/kg PO4 over 30 minutes IV, central administration needed or peripherally at 0.05 mmol/kg/hour
- GLUCOSE < 3 give 3ml/kg 10% dextrose bolus followed by infusion
- PH < 7.2 give half correction sodium bicarbonate

Details of solutions for drugs/electrolyte administration

Dobutamine

To calculate: 15 mg/kg of dobutamine in 50 mls of 5% dextrose or 0.9% Sodium Chloride will give 5 micrograms/kg/min if run at 1 ml/h

For a dose of 2-20 mcg/kg/min give 0.4-4 ml/h

Dopamine

To calculate 15 mg/kg of dopamine in 50 mls of 5% dextrose or 0.9% Sodium Chloride will give 5 mcg/kg/min if run at 1 ml/h. For a dose of 2-20 mcg/kg/min give 0.4-4 ml/h

Adrenaline.

Starting dose 0.1 mcg/kg/min. Dilute 300 mcg/kg of Adrenaline in 50 mls 0.9% Sodium Chloride and run at 1 ml/hr.

Sodium bicarbonate

Volume to give of 8.4% NaHCO₃ is 0.3 x Wt in kg x base deficit divide by 2

In neonates use 4.2% NaHCO₃ in a dose 0.3 x Wt in kg x base deficit

Give over 20 min.

Potassium

Potassium infusion rate maximum 10 mmol/h. Dilute before use, maximum peripheral concentration 40 mmol/l

Magnesium

If given peripherally dilute to 10% solution (100 mg/ml) and give 1 ml/kg

Phosphate

Dilute to 0.1 mmol phosphate in 1 ml of 0.9% Sodium Chloride or 5% glucose

STEROIDS

If meningococcal septicaemia

- **Do not treat** with high-dose corticosteroids (defined as dexamethasone 0.6 mg/kg/day or an equivalent dose of other corticosteroids).
- In children and young people with shock that is unresponsive to vasoactive agents, steroid replacement therapy using low-dose corticosteroids (hydrocortisone 25 mg/m² four times daily)^[12] should be used only when directed by a paediatric intensivist.

If meningitis suspected

- Give dexamethasone 0.15 mg/kg QDS to a maximum dose of 10mg daily for 4 days.
- If dexamethasone was not given before or with the first dose of antibiotics, but was indicated, try to administer the first dose within 4 hours of starting antibiotics, but do not start dexamethasone more than 12 hours after starting antibiotics.
- Give maintenance fluids with no restriction unless evidence of raised ICP or evidence of SIADH.
- Manage raised ICP (e.g. 3 % saline in a dose of 3 mls/kg or mannitol in a dose of 250-500mg/kg or ventilation)
- Regular assessment AVPU score

DO NOT USE CORTICOSTEROIDS IN CHILDREN YOUNGER THAN 3 MONTHS

CORRECT HAEMATOLOGICAL DISTURBANCE

- (blood/platelets/FFP)

Nasogastric tube

Keep the child nil by mouth for a minimum of 12 hours

Consider urinary catheter (urine output should be > 1ml/kg/hr)

THIS IS A NOTIFIABLE DISEASE

- Contact microbiologist ext 3031 or bleep via Switchboard
- Public Health (Ridgewood Centre) Telephone 01276 671718
- Contact tracing and prophylaxis – discuss with public health

Rifampicin dose is as follows:-

- Age < 1 year give 5 mg/kg bd for 2/7
- Age 1 – 12 years give 10 mg/kg maximum 600 mg bd for 2/7
- Age > 12 years and adults give 600 mg bd for 2/7
- Rifampicin preferred for adults but ciprofloxacin as a single dose 500 mg can be used if lots of contacts
- Both rifampicin and ciprofloxacin not recommended in pregnancy- discuss with microbiologist

Organise hearing test within 4-6 weeks via Audiology department in Guildford (Royal Surrey County Hospital)

MENINGOCOCCAL SEPTICAEMIA AND MENINGITIS

Signs and Symptoms

Purpura and ecchymosis may develop very rapidly in fulminant cases

It is important that all staff working in A&E familiarize themselves with the typical appearance of a meningococcal septicaemic rash.



Infants	Older children and adults
Fever	Fever
Irritability/fretfulness	Joint pains and myalgia
Vomiting	Vomiting
Poor feeding	Photophobia
High-pitched cry	Severe headache
Bulging anterior fontanelle	Change in conscious level
Fits	Fits
Drowsiness	Drowsiness and confusion

PATHOPHYSIOLOGY OF SEPTIC SHOCK

- Increased vascular permeability = Massive loss of circulating volume and Pulmonary oedema.
- Inappropriate vasoconstriction and dilation = V/Q mismatch & failure of organ perfusion.
- Intravascular thrombosis = purpura & gangrene & bleeding.
- Myocardial dysfunction.

PITFALLS IN DIAGNOSIS

- Assessment of severity is usually underestimated.
- Remember hypotension is a late sign.
- Parent not realizing the child is seriously ill.
- Fever – in GP and probably A&E 98% are viral, 2% bacterial, 0.2% serious.
- Irritability/febrile convulsion – LOOK for rash, tachycardia, tachypnoea, poor perfusion.
- Drowsiness in a teenager – mistaken for drug or alcohol intoxication.
- Maculopapular rash – can become purpuric, mistaken for antibiotic rash, Henoch Schonlein Purpura
- Limb pain.

INDICATION OF POOR PROGNOSIS AND NEED FOR ITU

Symptom/Sign	Score
Hypotension	3
Skin/core temperature difference > 3 degrees	3
Base deficit (cap sample)	1
Coma score < 8/15	3
Lack of meningism	2
Deterioration in the past hour (parent's view)	2
Widespread ecchymosis: spreading	1

Score 8 = Predicts Mortality

OTHER INDICATIONS FOR POOR PROGNOSIS

- Absence of leucocytosis - < 10,000 wbc/mm³
- Presence of DIC or renal failure.
- Petechiae present for < 12 hours
- ESR < 10 mm/hr

The severity of the disease is related to the level of circulating endotoxins:
< 25ng/l = mortality of 0%; > 10,000 ng/l = mortality 86% (> 700 is only seen in fulminant septicaemia).

See following site for useful guidelines:

www.meningitis.org