CHILDREN’S SERVICES

Guidelines for the Management of Meningococcal Septicaemia

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:
• BENZYLПENICILLIN < 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

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

FLUID BOLUS 20 ml/kg (may need to repeat)
Can be crystalloid (0.9% Sodium Chloride) or colloid (haemaccel, albumin)
Consider inotropes (doses below)

**DRUGS**

Children older than 1 month of age: CEFTRIAXONE. Dose is 80 mg/kg every 24 hours.
Neonates: CEFOTAXIME. Dose in babies < 7 days of age 50 mg/kg b.d; 7-21 days 50 mg /kg t.d.s.; 21-28 days 50 mg/kg q.d.s;

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

ADD AMOXICILLIN for children under 3 months of age to cover for listeria. Dose is 100 mg/kg every 12 hours if baby under 7 days of age, 7-28 days of age every 8 hours. 1-3 months of age, every 50mg/kg 4-6 hourly .

**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

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)

IF MENINGITIS SUSPECTED

• Give dexamethasone base 0.4 mg/kg bd. for 2/7 or 0.15 mg/kg QDS day for 4 days
• Give Maintenance fluids with no restriction
• Manage raised ICP (eg 3% saline in a dose of 3 mls/kg or mannitol in a dose of 250-500mg/kg or ventilation)
• Regular assessment AVPU score

THIS IS A NOTIFIABLE DISEASE

• Contact Dr. Grundy (micro Consultant) 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)

Reviewed and updated by Dr Bozhena Zoritch, Consultant Paediatrician, January 2013
MENINGOCCAL 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.

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

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

<table>
<thead>
<tr>
<th>Symptom/Sign</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypotension</td>
<td>3</td>
</tr>
<tr>
<td>Skin/core temperature difference &gt; 3 degrees</td>
<td>3</td>
</tr>
<tr>
<td>Base deficit (cap sample)</td>
<td>1</td>
</tr>
<tr>
<td>Coma score &lt; 8/15</td>
<td>3</td>
</tr>
<tr>
<td>Lack of meningism</td>
<td>2</td>
</tr>
<tr>
<td>Deterioration in the past hour (parent’s view)</td>
<td>2</td>
</tr>
<tr>
<td>Widespread ecchymosis: spreading</td>
<td>1</td>
</tr>
</tbody>
</table>

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