Joint Trust Guideline for the Management of: Bacterial Meningitis and Meningococcal Septicaemia in Children

A clinical guideline recommended for use

For Use in: Children’s Assessment Unit, Paediatric Wards, Accident and Emergency

By: Medical and Nursing Staff dealing with suspected/confirmed cases

For: Children and Young People (Birth – 16 years) with suspected /confirmed bacterial meningitis or meningococcal septicaemia

Key words: Bacterial Meningitis and Meningococcal Septicaemia

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If approved by committee or Governance Lead Chair’s Action; tick here ✓

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Description of changes (for revised versions): Page 5 – sentence about circumference measurement added. Prophylaxis from rifampicin to ciprofloxacin in line with PHE updated recommendations

Compliance links: e.g. NICE NICE guideline CG102

If Yes - does the strategy/policy deviate from the recommendations of NICE? If so why? No

This guideline has been approved by the Trust's Clinical Guidelines Assessment Panel as an aid to the diagnosis and management of relevant patients and clinical circumstances. Not every patient or situation fits neatly into a standard guideline scenario and the guideline must be interpreted and applied in practice in the light of prevailing clinical circumstances, the diagnostic and treatment options available and the professional judgement, knowledge and expertise of relevant clinicians. It is advised that the rationale for any departure from relevant guidance should be documented in the patient's case notes.

The Trust's guidelines are made publicly available as part of the collective endeavour to continuously improve the quality of healthcare through sharing medical experience and knowledge. The Trust accepts no responsibility for any misunderstanding or misapplication of this document.
Possible Meningococcal Disease
  e.g. fever, non-blanching rash, meningism

Immediate Assessment and Management
  • A&B - Give Oxygen + monitor
  • C - IV or IO access, take blood samples
  • < 3 months IV cefotaxime and IV amoxicillin (For Dose see BNFc
  • 3 months and older:
    o Dexamethasone 0.15mg/Kg (to max 10mg) if meningitic signs and not shocked.
    o Ceftriaxone 80mg/kg
  • Consider herpes encephalitis and need for acyclovir
  • INFORM CONSULTANT

Shock
  • 20mL/Kg 0.9% sodium chloride over 5-10 minutes.
  • Reassess. Further bolus of 20mL/Kg 0.9% sodium chloride and inform consultant paediatrician
  • If still shocked after 40mL/Kg, call Anaesthetist on Bleep 0012 and discuss appropriate place of admission

Ongoing Management on Buxton Ward HDU
  • Consider NG tube
  • Consider Urinary catheter
  • Consider Chest X-ray (pulmonary oedema)
  • Initially 2 hourly U&E/gases + BM stix
  • Strict fluid balance charting and hourly neuro obs
  • LP when stable (if not already)

Reassessment
  • Reassess initially minimum 4 hourly, record findings
  • Collate lab results, treat specific abnormalities
  • At reassessment, check all observations, examine for raised ICP and fluid balance status
  • Discuss with Consultant

Communicable Disease Control
  • Report to HPA Consultant
  • Complete referral card
  • Antibiotic prophylaxis for household contacts
  • Information leaflets

Follow Up
  • Hearing test in all before discharge (or within 4 weeks)
  • Out patients appointment at 4-6 weeks
  • Check vaccination status
  • Long term: consider disruption to growth plates – Look out for leg length discrepancy.

GP to give IM or IV Benzylpenicillin
  • >9 years: 1200mg
  • 1-9 years: 600mg
  • <1 year: 300mg
  • DO NOT DELAY TRANSFER TO HOSPITAL

Investigations
  • Blood tests:
    o FBC, Coag, group and save
    o U&Es, CRP, Ca, Mg, PO4, Glucose, BM stix
    o Blood culture, PCR, blood gas
    o LFTs, Troponin
    o Throat swab
    o Consider LP - Check Contraindications
  • INFORM CONSULTANT

Contraindications to LP (see pg. 4 for more detail)
  • Signs of raised Intracranial Pressure
  • Abnormal coagulation (if obtained), platelets <100x10⁹/L
  • Shock. Or extensive, rapidly spreading purpura (likely shock)
  • After seizures until stabilised/ back to normal
  • Respiratory compromise, local infection at LP site
  • If in doubt do not delay treatment

Admit to ITU pending transfer to PICU
  • Contact Addenbrookes PICU SpR on call to discuss case and request a bed
  • Contact CATS on 08000850003 if Addenbrookes unable to transfer/unable to take

Meningitis confirmed and not in shock
  Any of the following:
    • Frankly purulent CSF
    • CSF WBC count>1000/microlitre
    • Raised CSF WBC count and protein >1g/L
    • Bacteria on gram stain
  • Give Dexamethasone 0.15mg/kg to a maximum of 10mg, QDS for 4 days

Raised Intracranial Pressure
  • Signs
    o Decreasing or fluctuating level of consciousness
    o Relative bradycardia and hypertension
    o Dilated, unequal or poorly reactive pupils
    o Abnormal (decorticate/decerebrate) posturing
    o Other focal neurological signs
    o Papilloedema (late sign)
    o Abnormal ‘doll’s eye’ movements
  • Treatment
    o Mannitol 0.25 g/kg IV bolus over 5 min
    o Elevate head (30 degrees)
    o Consider elective intubation
    o Treat seizures
    o Obtain CT scan
  • Arrange admission to ITU and transfer to PICU as above

- full guideline
Objective

All infants and children attending NNUHFT with suspected Meningitis and Meningococcal Septicaemia should be treated according to the NICE guideline linked above. The quick reference algorithm above is based entirely on this, but with specifics around local care such as contact telephones numbers/bleeps/when to contact the consultant etc. Please refer to the full NICE document for more detailed information concerning the diagnosis and management of this disease.

Background

Without rapid resuscitation and aggressive management, children die of meningococcal sepsis. There is good evidence for optimum care. This document draws this evidence together for use in the NNUHFT.

In suspected meningitis without a rash, meningococcus (*N. meningitides* group B) is the most likely cause, with pneumococcus the next most likely. Peak incidence is in winter but occurs throughout the year.

Features associated with a worse prognosis:
- shock
- rash spreading after antibiotic treatment
- short history
- absence of meningism
- Low platelets (<150 x 10⁹/L)
- Low white cell count (<4.0 x 10⁹/L)
- hyperpyrexia (>40°C)
- coagulopathy

Severe disease progresses rapidly to haemodynamic collapse, disseminated intravascular coagulation, multisystem organ dysfunction, coma and death. Shock and raised intracranial pressure are the primary life threatening processes. Circulatory collapse is a result of a combination of capillary leak, intravascular volume depletion, vasodilation and myocardial failure.

Recognition

Consider in cases of fever & non-blanching rash, especially with altered consciousness. The prodrome is often non-specific with malaise, vomiting, myalgia, headache and altered sensorium. Exercise a high index of suspicion.

- Rash
  - Classically haemorrhagic petechial or purpuric
  - The early rash can be non-specific - macular and blanch on pressure
  - Always ask the registrar to review patients with petechial/purpuric rashes
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- Petechiae on a well child can be managed conservatively, see p11 NICE guideline

- Meningism – stiff neck, Kernig’s & Brudzinski’s sign, photophobia

- Headache

- Altered sensorium (Management of a Child (aged 0-18 years) with a Decreased Conscious Level. http://www.nottingham.ac.uk/paediatric-guideline/home2.htm)


Septicaemia – investigate and treat the infection as below.

Aggressively treat shock with 20mL/Kg of 0.9% sodium chloride over 5-10 minutes. Reassess and repeat if needed, inform the consultant paediatrician on call. If more than 40mL/Kg is needed, inform anaesthetist on bleep 0012 and consider appropriate place of admission. If a third bolus is required, make plans for intubation and ventilation and start treatment with vasoactive drugs. Give further fluids based on response, blood results and discussion with intensivist. Large volumes of fluid may be required over a short period of time.

Meningitis alone (not septicaemic shock)

Investigations:

- FBC, blood culture, CRP, U&E, LFT, Coaggulation,
- LP (see contraindications) -CSF for culture, prot, glucose, PCR.

Treatment

Infants and children > 3 months

IV Dexamethasone 0.15mg/Kg once.
Continue QDS for four days if CSF shows:
WCC >1000/microlitre
Raised CSF WBC count (>5cells/microlitre or >1 neutrophil/microlitre) and protein >1g/L
Bacteria on gram staining (see NICE guideline)
IV Ceftriaxone 80mg/Kg

Infants and neonates < 3 months

IV cefotaxime and IV amoxicillin (doses according to age in days as per BNFC)

Contraindications to LP

- Signs of raised intracranial pressure
  - Reduced or fluctuating level of consciousness
  - Relative bradycardia and hypertension
  - Focal neurological signs
  - Abnormal posture or posturing
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- Unequal, dilated or poorly responsive pupils
- Papilloedema (late sign)
- Abnormal ‘doll’s eye’ movements

- Shock
- Extensive and/or spreading purpura (likely to become shocked)
- After seizures until stabilised/back to normal conscious level
- Coagulation abnormalities (if obtained): results outside normal range, platelets <100x10⁹/L,
- Receiving anticoagulant therapy
- Local superficial infection at LP site
- Significant respiratory insufficiency (positioning for LP may cause deterioration)

Ongoing management

- Duration of treatment is dependent on the organism and the response to antibiotics. See NICE guideline and seek microbiology advice (Consult Dr Catherine Tremlett).
- All infants and children to have an audiology assessment as soon as they are well enough to do so (and within 4 weeks of disease)
- Consultant follow up 4-6 weeks (post audiology)
- If severe or profound deafness, refer ENT urgently for assessment for cochlear implants as soon as possible.
- Regular occipito-frontal head circumference measurement in infants (at least monthly) and prompt referral to paediatrics if crossing centile lines upwards.

Health Protection Agency (HPA)

Report the case to the HPA Consultant ASAP: This is a legal duty
Office hours: 01842 767 757
Out of hours: 01603 481 210 via Medicom (Ask for the Public Health Doctor on call for Norfolk)

Complete HPA referral card: 4 categories for referral:

- Possible – as for ‘probable’ but other diagnoses are at least as likely - These cases do not need to be reported
- Probable – clinical diagnosis without microbiological confirmation, where meningococcal disease is the most likely diagnosis.
- Clinically certain
- Microbiologically confirmed

Antibiotic prophylaxis for household contacts

- Prophylaxis is for all risk categories except ‘possible’
- Prophylaxis should be given within 24 hours and should be arranged with the HPA and GP
Prophylaxis reduces the risk of invasive disease, without it the attack rate in contacts rises 500-1200-fold. It does not eliminate the risk.

Asymptomatic nasopharyngeal carriage -10%

Prophylaxis is given to eliminate nasal carriage. Throat swabs from contacts is not necessary

Prophylaxis should be given to ‘Any person who, since 7 days prior to the onset of illness in the case, has lived and slept in the same household and/or had mouth-to-mouth kissing contact with a case/suspected case of meningococcal disease’

Record contacts in the notes: name, address, age, GP, college/school/playgroup

Staff: staff who have been intimately exposed to respiratory secretions, eg. during deep suction or intubation should discuss with Occupational Health the need for prophylaxis.

Ciprofloxacin is now recommended for use in all age groups and in pregnancy.

| Adults & children >12 years old | 500mg single dose |
| Children aged 5-12 years | 250mg single dose |
| Children <5 years | 30 mg/kg up to a maximum of 125mg single dose (suspension contains 250mg/5ml) |

Antibiotics should be offered as soon as practicable - ideally within 24 hours after diagnosis of the case. Where there is delayed confirmation of diagnosis, contacts should still be offered antibiotics up to four weeks after the onset of illness in the case.

Identifying the causative organism

The precise identification of the causative organism is important to the management of both the index case and contacts. It is crucial for epidemiology in the surveillance of clusters and outbreaks of invasive meningococcal disease.

Confirming the serotype of the infection is important to confirm the efficacy and detect non-responders to the MenC vaccine. Thus perform throat swab and PCR (blood EDTA sample, CSF for PCR in plain bottle).

Clinical audit standards

- All cases of meningitis alone to have IV dexamethasone before the administration of ceftriaxone.
- Septicaemia cases treated according to the algorithm – ABC, insertion of cannula and rapid administration of antibiotics (within 15 mins of admission to CAU). Rapid treatment of shock

Development

The guideline was drafted by the authors listed and discussed in the paediatric guideline meeting, from which several changes were made. Paediatric anaesthetic colleagues and A&E colleagues were circulated and their comments incorporated.

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Distribution: NNUH intranet

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