

## **1. Introduction and Scope**

This guideline covers the management of patients with suspected bacterial meningitis and/or meningococcal septicaemia in adults following arrival at UHL. For management of patients identified as having suspected bacterial meningitis and/or meningococcal septicaemia before they arrive at UHL, refer to the Antibiotic Guidelines for Primary Care.

## **2. Guideline Standards and Procedures**

### **2.1. Recognition, severity and immediate management (within 1 hour of admission)**

Patients can deteriorate rapidly and may require care in Resus, ACB or ITU

- Presence of non-blanching purpuric/petechial rash usually indicates meningococcal septicaemia
- Remember that signs of meningitis may be absent in septicaemia
- Assess Airway, Breathing, Circulation and Neurology status and involve ITU if necessary
- Perform venous cannulation and venepuncture for investigations
- Take blood cultures before administering antibiotics
- Administer appropriate antibiotics +/- steroids before radiological investigations
- Antibiotics should be given within one hour of presentation to hospital
- Intravenous fluids and oxygen if required
- Isolate for 24 hours
  
- Screen for sepsis using the Adult Sepsis Screening Tool [ <http://bit.ly/PAGLsepsis> ]
- Initiate the [Sepsis 6 Bundle](#) if indicated
- Do NOT give STAT dose of 1 g meropenem for patients with suspected meningitis
  - Higher doses of meropenem are required in suspected bacterial meningitis
  - Give IV antibiotics at the doses specified below (section 2.5)

### **2.2. Investigations**

- Blood for FBC, U&E, glucose, LFT, CRP, clotting, lactate and HIV serology
- Blood cultures and a bacterial throat swab and skin lesion aspirate should be sent before antibiotics, if it is safe to do so. Bacterial throat swabs are sent using a black charcoal swab, and skin lesion aspirate sent using a black charcoal swab to take a sample of pus from under the skin lesion.
  - Send skin lesion aspirate using standard microbiology paper form, or, if using electronic requesting, select “Microbiology/Virology” and select “Pus swab for MCS” and enter a request for “Meningococcal culture” in one of the free text boxes.
- Lumbar puncture (see below) should be performed before starting antibiotics if it is safe to do so.
- EDTA blood sample to microbiology for meningococcal and pneumococcal PCR
  - Send 4.9ml pink-topped EDTA specimen using standard virology paper form, or, if using electronic requesting, select “Microbiology/Virology”, then select “UHL PCR tests”, and then select “Meningococcal and Pneumococcus PCR”
- Medication history should document details of any antimicrobials given before admission (e.g. STAT dose of benzylpenicillin given in primary care).

**2.3. Urgent CT Head scan is required before LP** if there are clinical signs suggestive of a shift of brain compartments or if a patient has risk factors for an evolving space-occupying lesion.

There is a theoretical risk that an LP, by lowering the pressure, might make such shift worse, resulting in a brain herniation syndrome.

Signs of a shift of brain compartments, and which require a CT scan prior to LP are:

- Reduced level of consciousness (GCS  $\leq 9$  or a progressive and sustained or rapid fall in level of consciousness)
- New focal neurological signs (including seizures or posturing)
- Presence of papilloedema (although the inability to view the fundi is not a contraindication to LP, especially in those with a short history of illness)
- Continuous or uncontrolled seizures
- Abnormal pupillary reactions

In the absence of above features, a CT scan is not required prior to performing a lumbar puncture.

## 2.4. Lumbar puncture (LP)

Please see UHL's Standard Operating Procedure for Lumbar puncture [LocSSIP \(Trust reference C15/2020\)](#)

A prior CT head scan is not necessary if the patient does not have any of the signs in 2.3 above

- Do not perform LP in suspected meningococcal septicaemia with purpuric rash, or if there is infection at the site of LP
- If the patient is anticoagulated then discuss with the haematology on call registrar or consultant first
- National guidelines state that in other individuals, an LP should be performed within one hour of arrival to hospital if it safe to do so
- An LP should ideally be done before antibiotics are given, unless the patient is septic, or there is a delay in performing an LP for other reasons
- Send CSF for biochemistry (protein and glucose), microbiology (MC&S), and pneumococcal and meningococcal PCR (minimum 1 ml each bottle)
  - Send CSF specimen using standard virology paper form, or, if using electronic requesting, select "Microbiology/Virology", then select "UHL PCR tests", and then select "Meningococcal and Pneumococcus PCR" and type that this is a CSF specimen in the "Clinical details" box
- Record the following in the case-notes:
  - Opening pressure
  - Appearance (e.g. pus, cloudy, clear, blood-stained)
- Send serum sample for glucose at the same time. Include lactate if antibiotics have not been given

## 2.5. Empirical antibiotic therapy

- Antibiotics should be given within one hour of presentation to hospital
- First line treatment is IV ceftriaxone 2 g immediately and continued every 12-hours initially
- For patients 60 years or older, or pregnant, or immunocompromised (including diabetes and alcohol abuse) give IV ceftriaxone 2 g every 12 hours, and add IV amoxicillin 2 g every 4 hours to cover *Listeria*

- If patient has a severe allergy to penicillin or cephalosporins (e.g. anaphylaxis) then IV meropenem 2 g every 8 hours can be used (to cover *Neisseria meningitidis*, *Streptococcus pneumoniae*, *Haemophilus influenzae* and *Listeria monocytogenes*).
  - Discuss with microbiology if patient has a severe allergy to penicillin, cephalosporins AND meropenem
- After initial antibiotic therapy, discuss with Microbiology/Infectious diseases if:
  - Travel abroad – Due to varying risks of penicillin resistant pneumococcal infections
  - Patient is at risk of TB (e.g. close contact to people with TB, or travel to endemic area) or fungal (e.g. immunocompromised) meningitis – May need to consider adjunct agents to cover these organisms.
- Do not routinely give intravenous acyclovir unless herpes simplex encephalitis is strongly suspected.

## 2.6. Steroid therapy in bacterial meningitis without signs of meningococcal sepsis

Evidence suggests that steroids may be of benefit if given early, particularly if pneumococcus is suspected.

In **all** cases of suspected bacterial meningitis:

- Dexamethasone 10 mg IV every 6 hours must be started on admission, either shortly before or with the first dose of antibiotic
- If antibiotics have already been started but you are within 12 hours of the first antibiotic dose, then commence dexamethasone 10mg IV every 6 hours
- Continue dexamethasone for 4 days in confirmed or clinically suspected pneumococcal meningitis or *Haemophilus influenzae* type b.
- If the causative agent is not pneumococcal meningitis or *haemophilus influenzae* type b then steroid treatment should be stopped

## 2.7. Continuing management

- Volume support (keep patients euvolaemic), supplemental oxygen, glycaemic control, senior review
- Destination of the patient will depend upon how clinically stable they are:
  - Consider ITU if necessary, or ACB if closer monitoring is required than can be met in a normal ward environment
  - If clinically stable, then transfer to single room (Infectious Diseases Unit within hours or AMU out of hours)
  - Ultimate admission to IDU should be considered for all proven bacterial meningitis
- Inform the local UK Health Security Agency Public Health team via <https://www.gov.uk/guidance/contacts-phe-health-protection-teams#east-midlands-hpt> or through the hospital switchboard. If out of-Hours call the same number, which is directed through to the East Midlands Ambulance service and ask for the doctor on-call for communicable diseases.
- You may be asked to prescribe antibiotics for 'contacts' under the direction of Public Health
- Amend antibiotics after discussion with microbiology or infectious diseases with results of LP microscopy and/or culture tests. Duration is dependent on identified or most probable organism

## 3. Education and Training

No additional education and training required within this guideline.

#### 4. Monitoring compliance

What will be measured to monitor compliance	How will compliance be monitored	Monitoring Lead	Frequency	Reporting arrangements
Adherence to antimicrobial therapy	Annual Trust wide prescribing audit	Antimicrobial pharmacists	Annually	To CMG boards

#### 5. References and Further Information

- McGill. F., *et al.*, (2016) The UK joint specialist societies guideline on the diagnosis and management of acute meningitis and meningococcal sepsis in immunocompetent adults, *Journal of Infection*, **72** (4): 405-438
- Van de Beek. D., *et al.*, (2016) ESCMID guideline: diagnosis and treatment of acute bacterial meningitis, *Clinical Microbiology and Infection*, **22**:1-26
- Public Health England, (2012, updated 2019) Guidance for public health management of meningococcal disease in the UK, Public Health England, UK.
- Brouwer. M., *et al.*, (2015) Corticosteroids for acute bacterial meningitis, *The Cochrane database of systematic reviews*

#### 6. Key Words

Meningitis, meningococcal, pneumococcal, bacterial meningitis

CONTACT AND REVIEW DETAILS	
<b>Guideline Lead (Name and Title)</b> Dr Helena White (ID Consultant)	<b>Executive Lead</b> Medical director
<b>Contributing Authors</b> Dr Ryan Hamilton (Antimicrobial Pharmacist)	<b>Ratified by</b> Antimicrobial working party - 13 <sup>th</sup> September 2022 PGC 14.10.22
<b>Details of Changes made during review:</b> <ul style="list-style-type: none"> <li>• Diagnostic guidance updated</li> <li>• Reordered empirical antibiotic therapy</li> <li>• Updated PHE to UKHSA and added contact information and link</li> </ul>	

Review Record			
Date	Issue No.	Reviewed By	Description of change (if any)
14.3.17	2	H A White & R Hamilton	<ul style="list-style-type: none"> <li>• Updated guidance from those referenced</li> <li>• Updated PHE contact details</li> <li>• Formatting changed</li> <li>• Diagnostic guidance updated</li> <li>• Nature of penicillin allergy clarified</li> <li>• Steroid guidance clarified</li> <li>• Additional section regarding sepsis and link to guideline added</li> </ul>

13.09.2 4	3	H A White	<ul style="list-style-type: none"><li>• Updated in line with new NICE guidance</li></ul>
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