

## Meningitis (Adults)

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## Introduction and Purpose

Antimicrobial Guidelines are intended to provide clinicians guidance on the management (both treatment and prevention) of common infections. This guideline forms part of a series of antimicrobial guidelines.

The clinical guidelines provide evidence based and best practice on the management of patients with infective episodes. They include empirical antimicrobial therapy including dose, route and duration of therapy and where necessary microbiological investigations and

## Objectives

- To improve the quality of antimicrobial prescribing and reduce inappropriate prescribing.
- To maximise the clinically effectiveness of antimicrobial agents used.
- To reduce drug related toxicity and development of antimicrobial resistance.
- To ensure cost effective use of antimicrobial agents.

## Scope

This guideline applies to all healthcare professionals involved in the prescription, administration and monitoring of antimicrobial agents.

## Development and consultation

The clinical guidelines have been produced by the lead clinician and lead pharmacist for each division in conjunction with microbiology.

## Implementation and Monitoring and documentation

Implementation and adherence to the guidelines is the responsibility of the lead clinician and lead pharmacist for each division.

Key aspects of the guidelines will be monitored as part of the annual audit programme.

## DO NOT DELAY STARTING TREATMENT

- Patients suspected of having meningitis should have **IMMEDIATE:**
  - Assessment **AND INTRAVENOUS ANTIBIOTIC THERAPY**
  - Specimens taken (see below)
  - Discussions concerning the need for critical care if poor prognostic markers present
- Contact microbiology technician as soon as the specimens are ready to be processed.
- Contact the on-call microbiologist for treatment advice via switchboard
- Treatment may need to be modified according to microbiology results; decisions on treatment duration should be based on clinical and microbiological features.

### Classical signs and symptoms

- Triad of fever, neck stiffness and impaired consciousness
- Rapid onset headache
- Photophobia
- Rash e.g. petechiae, purpura, non-blanching. The rash may be non-specific and up to 50% of patients may not have a rash on first presentation.
- Possible signs of raised intracranial pressure e.g. seizures
- Septicaemia with meningococcal rash (fails to blanch when a glass is rolled over it)

### Markers of poor prognosis and severity

The following warn of impending/worsening shock, respiratory failure or raised intracranial pressure. It is axiomatic that all patients with suspected meningitis are immediately discussed with the Consultant responsible for care, whether these markers are present or not.

- |                                |                        |                                 |
|--------------------------------|------------------------|---------------------------------|
| • Age > 60 years               | • WBC < 4              | • Respiratory rate < 8 or > 30  |
| • Rapid rash progression       | • Deranged clotting    | • Oliguria                      |
| • Pulse < 40 or > 140 bpm      | • Systolic BP < 90mmHg | • Capillary refill time > 4 sec |
| • Acidosis pH <7.3             | • Papilloedema         | • Focal neurology               |
| • Depressed or fluctuating GCS | • Persistent seizures  |                                 |

### Investigations

- Do NOT perform lumbar puncture if there are contra-indications (such as evidence of increased intracranial pressure and either focal or asymmetric neurology) or if there is evidence of meningococcal septicaemia (progressive petechial/purpuric rash).
- CT scans with contrast are obligatory if the patient has papilloedema, depressed consciousness, focal neurological signs, abnormal pupil responses or reflex eye movements. They are also indicated in immunosuppressed patients, or those with a subacute presentation, to exclude alternative diagnoses.. **Scans should not delay administration of antibiotics.**

### Useful and necessary microbiological specimens

- Blood cultures (essential).
- EDTA blood for meningococcal PCR.
- CSF for microbiology and chemistry (remember to send simultaneous blood for glucose). (see above for contraindications)
- CSF for Herpes virus I and II PCR if indicated
- Throat swab requesting meningococcus culture.
- Scraping of petechial skin lesions, with application to a glass slide, may be useful, as a Gram stain might confirm the presence of Gram negative meningococci within an hour.. Inform Microbiology if you plan to take scrapings.

### Differential diagnosis

The differential diagnosis of meningitis includes subarachnoid haemorrhage, cerebral abscess and cerebral venous thrombosis.

Immunocompromised, neonatal, herpetic, tuberculous and cryptococcal meningitis may not present as above. If suspected, seek advice.

**CNS** Infection with Herpes virus may present similarly with severe headache, but usually also has an encephalitic component, with confusion, abnormal behaviour, and memory loss.

**If the diagnosis is anything less than obvious, it is prudent to also administer intravenous aciclovir.**

### Infection control

- All possible, probable, and definite cases of meningitis should be discussed with the infection control nurses as soon as is practicable.  
Bacterial meningitis is a notifiable disease. Please notify local Health Protection Unit.
- All meningitis patients should be isolated for 24 hours unless meningococcal disease is excluded, unless this is considered to compromise safe patient care.

### ACUTE MENINGITIS (Empirical treatment)

**Start treatment *immediately*.** Administration of appropriate antibiotics should not be delayed whilst undertaking or awaiting results of investigations.

**Do NOT give the antibiotics intrathecally.**

<b>1<sup>st</sup> choice</b>	<u>Ceftriaxone</u> 2g IV 12 hourly If there is no venous access, give by deep IM injection. Reconstitute vial with 7ml of Lidocaine Hydrochloride 1% injection, and administer in more than one site.
<b>β-lactam allergy</b>	<u>Chloramphenicol</u> 2 Grams qds initially. Discuss subsequent therapy with Microbiology.
<b>If patient is Immunocompromised patients</b>	Discuss therapy/treatment options with Microbiology
<b>If NO rash present (i.e. pneumococcus suspected)</b>	<b>Add <u>Dexamethasone</u> 0.15 mg/kg IV 6 hourly for 4 days. The first dose given <u>with or just before</u> the first dose of antibiotics</b>
<b>If altered mental state suggests acute viral encephalitis</b>	<b>Add <u>Aciclovir</u> IV 10mg/kg 8 hourly</b>

## NON-BACTERIAL MENINGITIS (e.g. viral or fungal)

Contact Microbiology for advice.

### ONGOING TREATMENT

The duration of therapy should be determined according to clinical response and repeat CSF as necessary.

Organism identified	Duration of therapy
If organism not isolated but clinical findings and CSF are consistent with bacterial meningitis	7 - 14 days according to clinical response
<i>Neisseria meningitidis</i> (meningococcus)	5 days
<i>Streptococcus pneumoniae</i> (pneumococcus)	14 days
<i>Haemophilus influenzae</i>	10 days
<i>Listeria monocytogenes</i>	IV Amoxicillin for 14 days. Discuss with microbiology
If viral encephalitis is proven due to HSV (or very rarely) VZV	Continue IV Aciclovir for 14 - 21 days

### CHEMOPROPHYLAXIS FOR CLOSE CONTACTS

Meningococcal infection		
<b>Index case</b>	Ceftriaxone eliminates nasopharyngeal carriage of meningococcus. Patients who have <b>not received ceftriaxone</b> should be given: <u>Ciprofloxacin 500mg PO single dose</u> OR <u>Rifampicin 600mg PO 12 hourly for 2 days</u> NB - Ciprofloxacin is contra-indicated in pregnancy.	
<b>Close contacts</b>	<b>1<sup>st</sup> choice</b>	<b>Alternative</b>
<b>Adults</b>	<u>Ciprofloxacin 500mg PO single dose</u>	<u>Rifampicin 600mg PO 12 hourly for 2 days</u>
<b>Children</b>	<u>Ciprofloxacin 15mg/kg PO single dose (unlicensed indication)</u>	<u>Rifampicin 12 hourly PO for 2 days (max 600mg PO 12 hourly)</u> <1 year: 5mg/kg 1 – 12 yrs: 10mg/kg over 12 yrs: 600mg

<b>H. influenzae infection</b>		
If an unvaccinated child <4 years of age lives in the same household as the patient, prophylaxis should be given to the <b>entire</b> household for 4 days (including the patient).		
<b>Close contacts</b>	<b>1<sup>st</sup> choice</b>	<b>Alternative</b>
<b>Adults</b>	Ciprofloxacin 250mg PO 12 hourly for 3 days ( <i>unlicensed indication</i> )	Rifampicin 600mg PO 24 hourly for 4 days
<b>Children</b>	Ciprofloxacin 7.5mg/kg PO 12 hourly for 3 days ( <i>unlicensed indication</i> )	Rifampicin 24 hourly PO for 4 days (max 600 mg PO 24 hourly) <3 months: 10mg/kg 3 mths – 12 yrs: 20mg/kg over 12 yrs: 600mg

<b>Pneumococcal infection</b>
No prophylaxis required

## REFERENCES

1. British Infection Society. Early Management of suspected bacterial meningitis and meningococcal septicaemia in immunocompetent adults. Journal of Infection 2003; 46(2). Available at: <http://www.britishinfectionsociety.org/drupal/sites/default/files/MeningitisAlgorithm03.pdf>
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