

POLICY FOR TREATMENT OF CENTRAL NERVOUS SYSTEM INFECTIONS IN ADULTS

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*This document is part of antibiotic formulary guidance
Formulary guidance holds the same status as Trust policy*

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1) Meningitis

Definition

Inflammation of the meninges – may be bacterial, viral or aseptic meningitis. The classic triad of fever, neck stiffness and altered mental status (GCS \leq 14) is not always present. May have signs specific to the infecting organism e.g. purpuric rash in meningococcal meningitis. In culture-proven bacterial meningitis:

95% of patients have 2 of the following symptoms and signs

99% of patients have at least 1

- Headache
- Fever
- Neck stiffness
- Altered mental state

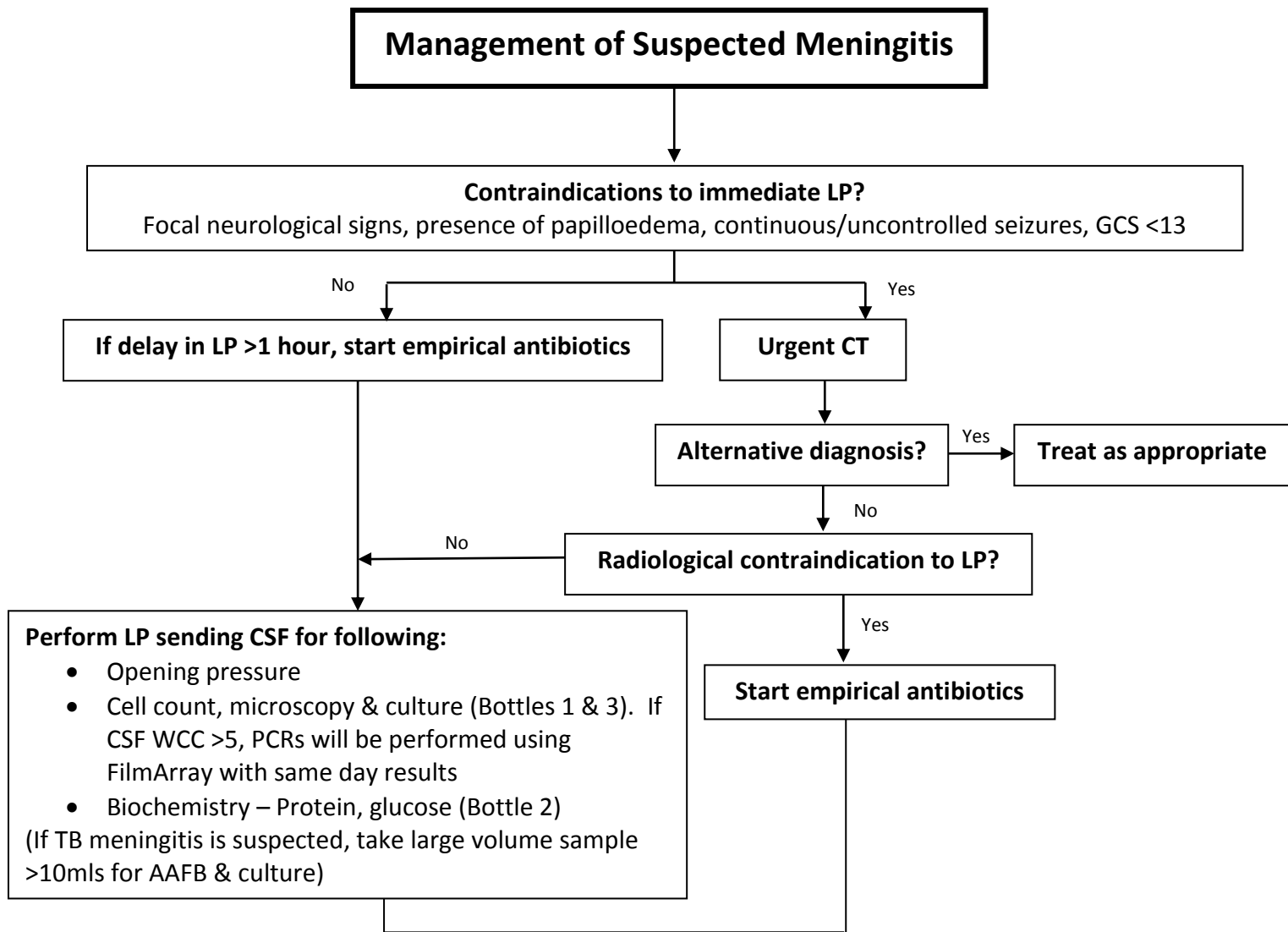
Viral meningitis is thought to account for about 50 – 80% of all cases of ‘meningitis’.

Common causative organisms

Bacterial meningitis	Viral meningitis
<ul style="list-style-type: none">• <i>Neisseria meningitidis</i>• <i>Haemophilus influenzae, type B</i>• <i>Streptococcus pneumoniae</i>• <i>Listeria monocytogenes</i> (especially in patients who are immunocompromised, diabetic or alcohol dependent)• <i>M.tuberculosis</i>	<ul style="list-style-type: none">• <i>Herpes simplex virus(HSV)-usually HSV-2</i>• <i>Varicella Zoster virus(VZV)</i>• <i>Enterovirus</i>

Please note: CSF PCR testing (using FilmArray) is available at DRI labs to facilitate rapid diagnosis and rationalisation of antibiotics and antivirals.

Management of Suspected Meningitis



	1 st line	2 nd line or if history of Penicillin anaphylaxis	Duration
Adults < 60 years	Cefotaxime (IV) 2g 6-hourly	Chloramphenicol (IV) 25mg/kg 6-hourly	<i>Meningococcal</i> – 5 – 7 days
Adults ≥ 60 years Immunocompromised, diabetes or alcohol excess	Cefotaxime (IV) 2g 6-hourly AND Amoxicillin (IV) 2g 4-hourly (OR if rash allergy to Penicillin, Co-trimoxazole IV 15mg/kg 6-hourly)	Chloramphenicol (IV) 25mg/kg 6-hourly AND Co-trimoxazole (IV) 15mg/kg 6-hourly (double the dose in severe infections)	<i>Pneumococcal</i> – 10 - 14 days <i>Haemophilus influenzae</i> – 10 days <i>Listeria</i> – 21 days <i>Enterobacteriaceae</i> (eg E.coli)- 21 days Viral – Stop antibiotics, treatment is supportive
If travel in last 6 months to country with high penicillin resistance	Consider discussing further with Microbiologist. High risk countries include: <i>Canada, China, Croatia, Greece, Italy, Mexico, Pakistan, Poland, Spain, Turkey</i>		

All cases of suspected bacterial meningitis should receive IV dexamethasone 8.3mg QDS within 12 hours of first dose of antibiotic. If pneumococcal meningitis is confirmed, then continue dexamethasone for total 4 days.

Additional testing

- 2 sets blood cultures (preferably before antibiotics)
- Pneumococcal & meningococcal PCR on blood
- Blood Borne Virus testing
- Bacterial throat swab for MC&S
- If viral meningitis is likely: Viral throat swab for respiratory viruses & enterovirus and stool for enterovirus PCR
- If HIV positive, please discuss with Infectious Diseases in Sheffield regarding additional testing

2) Meningococcal septicaemia

Definition

Evidence of sepsis +/- characteristic petechial/purpuric skin rash and hypoperfusion. *Neisseria meningitidis* may be identified from blood, CSF or skin lesions.

Patients with meningococcal septicaemia can deteriorate rapidly. The classic petechial or purpuric rash occurs in \approx 60%, but this can be a late sign. Certain symptoms that should raise alarm are severe muscle pain (a possible feature of systemic bacterial sepsis) or thirst (a prominent feature of impending shock even when the blood pressure is normal). Temperature may be high, low or normal.

Common causative organism	Microbiological Investigations
<i>Neisseria meningitidis</i>	<ul style="list-style-type: none">• Blood cultures• Meningococcal and pneumococcal PCR (1 x EDTA tube to microbiology)• Throat swab for MC&S Note: LP should NOT be performed in these patients.

Treatment

1 st line	Penicillin anaphylaxis	Duration
Cefotaxime (IV) 2g 6-hourly	Chloramphenicol (IV) 25mg/kg 6-hourly	7 days

3) Encephalitis

Definition

Inflammation of the brain substance. Involvement of particular areas of the brain can occur with specific pathogens.

Usually presents with headache, fever, change in cognitive state (e.g. confusion, personality change). Focal features, such as reduced GCS or seizures, may occur.

The most frequent cause of encephalitis in the UK is HSV-1. It tends to affect the temporal and/or frontal lobes.

Bacterial, parasitic and fungal causes are rare in the UK. However, if there is a relevant travel history and additional CSF PCR testing is needed, discuss with Virologist (at Northern General Hospital) or the Microbiologist for further advice.

Common causative organisms	Microbiological Investigations	Additional tests
<i>Herpes simplex virus (HSV) – usually HSV-1</i> <i>Varicella zoster virus (VZV)</i> <i>Enterovirus</i>	<ul style="list-style-type: none">• Blood cultures• Lumbar puncture• CSF microscopy, culture• CSF PCR testing will be done (using FilmArray with same day results) if CSF WCC >5 or where there is high suspicion for encephalitis (please indicate this on the request form)• Throat swab & stool for enterovirus PCR• If vesicles present, send viral skin swabs• Meningococcal and pneumococcal PCR (EDTA sample) to help rule out bacterial meningo-encephalitis <p>Note: Additional CSF investigations may be indicated if immunocompromised, recent travel or if at risk exposure. Please discuss with Virologist (based at Northern General Hospital) if appropriate.</p>	<ul style="list-style-type: none">• MRI brain• Consider EEG

Treatment

Treatment of patients early in the course of the illness, before the development of necrosis, is essential for better outcome.

1 st line	Duration
<p>Aciclovir 10mg/kg 8-hourly (IV)</p> <p>In obese patients, ideal body weight should be used to calculate dose, to avoid excessive doses.</p> <p><u>Ideal body weight (IBW) calculation:</u></p> <p>Female IBW (kg) = height (cm) -105</p> <p>Male IBW (kg) = height – 100</p>	<ul style="list-style-type: none">• If proven HSV encephalitis, continue aciclovir for 14 days (or 21 days if immunocompromised)• Repeat LP at the end of treatment to confirm that HSV PCR negative before stopping treatment• If CSF still positive, then continue treatment with weekly LPs until HSV PCR negative• Maintain good hydration and monitor U&E whilst on aciclovir

Note:

HSV PCR may be negative in the first few days of illness. If the initial LP is done < 72 hours of symptom onset and HSV PCR is negative, then consider repeat LP if high clinical suspicion of viral encephalitis.

References

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