### Presumed Meningitis and Meningoencephalitis

**Scope (Staff):** Clinical Staff – Medical, Nursing, Pharmacy

**Scope (Area):** Perth Children’s Hospital (PCH)

This document should be read in conjunction with this DISCLAIMER

Prior to the initiation of antibiotic therapy, appropriate microbiology samples should be collected. DO NOT delay the administration of antibiotics in clinically unwell patients or wait for results of investigations.

<table>
<thead>
<tr>
<th>CLINICAL SCENARIO</th>
<th>Usual duration</th>
<th>DRUGS/DOSES</th>
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<tr>
<td><strong>Meningitis / meningoencephalitis &lt; 1 month of age</strong> (community acquired)</td>
<td>See below</td>
<td><strong>Standard Protocol</strong>&lt;br&gt;IV cefotaxime&lt;br&gt;AND&lt;br&gt;IV benzylpenicillin&lt;br&gt;AND&lt;br&gt;IV aciclovir (doses as per neonatal guidelines)&lt;br&gt;&lt;br&gt;<strong>Known or Suspected MRSA</strong>&lt;br&gt;&lt;br&gt;<strong>Penicillin allergy Delayed</strong>&lt;br&gt;&lt;br&gt;<strong>Penicillin allergy Immediate</strong>&lt;br&gt;&lt;br&gt;Discuss with ID or Microbiology Service</td>
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<td><strong>Meningitis ≥ 1 month of age</strong> (community acquired)</td>
<td>See below</td>
<td><strong>IV dexamethasone</strong> before or with the first dose of antibiotics as per local guidelines&lt;br&gt;Consider the need to also cover for HSV infection (see below).&lt;br&gt;&lt;br&gt;<strong>IV ceftriaxone</strong> 50mg/kg/dose (to a maximum of 2 grams) 12 hourly&lt;br&gt;Add IV vancomycin if:&lt;br&gt;i.) Gram-positive cocci are seen on Gram stain; <strong>OR</strong>&lt;br&gt;ii.) the patient has known or suspected otitis media or sinusitis; <strong>OR</strong>&lt;br&gt;iii.) has been recently treated with a penicillin, cephalosporin or carbapenem antibiotic <strong>OR</strong>&lt;br&gt;iv.) is too unwell to undergo a lumbar puncture.&lt;br&gt;&lt;br&gt;As per standard protocol</td>
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Once the organism has been identified and the results of susceptibility testing are available choose the appropriate directed regimen and duration:

- *N. meningitidis* 5-7 days<br>- *S. pneumoniae* 10-14 days<br>- *H. influenzae* 7-10 days<br>- Group B strep 14-21 days<br>- Gram negative bacilli 21 days<br>- Listeria 21 days<br>- No pathogen identified – Discuss with ID or Microbiology Service

For confirmed *N. meningitidis*, *H. influenza* or *S. pyogenes* meningitis, consider the need for post exposure prophylaxis for contacts as per the ChAMP Medical prophylaxis guideline.
### CLINICAL SCENARIO

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<th>Encephalitis&lt;sup&gt;f&lt;/sup&gt;</th>
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| ≥ 1 month of age        | 14-21 days if HSV confirmed | **If bacterial meningitis or sepsis has not been excluded, in addition to encephalitis treatment, start antibiotics as per Meningitis recommendations above.**  
**IV aciclovir<sup>g</sup>**  
- <5 years: 20mg/kg/dose (to a maximum of 750mg) 8 hourly;  
- ≥ 5 years to < 12 years: 15mg/kg/dose (to a maximum of 750mg) 8 hourly;  
- ≥ 12 years old: 10mg/kg/dose (to a maximum of 750mg) 8 hourly  
**5 days**  
**Oral oseltamivir 3mg/kg/dose (to a maximum of 75mg) twice daily for five days should be added empirically during flu season (July to September inclusive) and where there is clinical concern. Information regarding influenza activity can be found on Virus WAtch** |
| Suspected or proven nosocomial or post-neurosurgical meningitis (including shunt meningitis) | At least 14 days after last positive culture | **IV cefepime 50mg/kg/dose (to a maximum of 2 grams) 8 hourly AND**  
**IV vancomycin<sup>d</sup> 15mg/kg/dose (to a maximum initial dose of 750mg) 6 hourly** |
| Meningitis/meningoencephalitis in an immunocompromised child | varies | **Discuss with ID or Microbiology service** |

#### a) Neonatal meningoencephalitis:
- Discuss all cases with ID/microbiology
- Send CSF for cell count, protein, glucose, culture and viral PCR (HSV, enterovirus, parechovirus)
- In addition consider blood culture, EDTA blood for HSV PCR, enterovirus/parechovirus swabs (throat, and rectal) and HSV swabs (throat, rectal, eye, umbilical)

#### b) Children known or suspected to be colonised with MRSA may need to have their therapy/prophylaxis modified. Children suspected of having MRSA include:
- Children previously colonised with MRSA
- Household contacts of MRSA colonised individuals
- In children who reside in regions with higher MRSA rates (e.g. Kimberley and the Pilbara) a lower threshold for suspected MRSA should be given
- Children with recurrent skin infections or those unresponsive to ≥ 48 of beta-lactam therapy. For further advice, discuss with Microbiology or ID service

#### c) An immediate (IgE mediated) reaction is characterised by the development of urticaria, angioedema, bronchospasm or anaphylaxis within 1 to 2 hours of drug administration. Delayed reactions including maculopapular or morbilliform rashes, drug fever and cytopenias and are more in keeping with other forms of immunological reactivity. Isolated diarrhoea is not usually immune-mediated and does NOT contraindicate the future use of an antibiotic.

#### d) IV vancomycin 15mg/kg/dose (to a maximum initial dose of 750mg) given via slow infusion 6 hourly. Therapeutic drug monitoring is required.
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e) IV moxifloxacin 10mg/kg/dose (to a maximum of 400mg) given once daily. Moxifloxacin is a red/restricted agent and requires ChAMP approval prior to prescribing.
f) Encephalitis definition:
   - **Major criteria (required):**
     - Decreased or altered level of consciousness or lethargy or personality change lasting >24 hours
   - **Minor criteria (2 for possible; >3 for probable/confirmed encephalitis):**
     - Documented fever (>38°C) within 72 hours before or after presentation.
     - Generalised or partial seizures not fully attributable to a pre-existing seizure disorder.
     - New onset of focal neurological findings.
     - CSF WBC count >5/mm³.
     - New abnormality of brain parenchyma on neuro-imaging suggestive of encephalitis.
     - Abnormality on EEG that is consistent with encephalitis.
g) Start aciclovir therapy in all patients with suspected acute encephalitis while further investigations are underway as herpes simplex virus (HSV) is the most common treatable cause of encephalitis. Herpes simplex encephalitis can usually be excluded and empirical therapy stopped based on negative CSF nucleic acid amplification tests (e.g. polymerase chain reaction [PCR]) and a normal MRI. However, tests for herpes simplex virus in CSF can be negative in very early disease (before day 3 of illness); consider a repeat lumbar puncture and PCR if clinical suspicion is high.
   If concerns for HSV encephalitis persist despite a negative PCR please discuss with ID/microbiology.
   If HSV encephalitis is confirmed treatment duration is 14-21 days.

**Related internal policies, procedures and guidelines**

- Antimicrobial Stewardship Policy
- ChAMP Empiric Guidelines

**References**

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<tr>
<td>Document Owner</td>
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