

## BACTERIAL MENINGITIS

### Clinical Presentation:

- Classic clinical presentation of fever, neck stiffness and altered mental status were found to be present in 44-67% of patients with bacterial meningitis
  - However, 99-100% of patients will have at least *one* of these findings
- Rash (particularly petechiae or purura) are most common in meningococcal meningitis, but may be observed in patients with meningitis caused by other organisms (e.g. *S. pneumoniae*, *H. influenzae* and *L. monocytogenes*)

### Investigations and Management:

- ID consult strongly recommended
- Obtain cultures PRIOR to antibiotic administration when possible, **although empiric antibiotics should not be delayed for diagnostic tests**
- Lumbar puncture
  - Send for cell count, white blood cell differential count, glucose, protein, bacterial culture and sensitivities and viral PCR (routine panel in Hamilton Health Sciences include HSV, VZV, enterovirus, parechovirus in children < 6 months)
- Blood cultures
- Head CT should be considered if patient has abnormal level of consciousness, papilledema, has a focal neurologic deficit, or if immunosuppressed
- Should consider dexamethasone (0.15 mg/kg [maximum 10mg] IV q6h x 2-4 days). The first dose should be given BEFORE or WITH THE FIRST DOSE of antibiotics. There is data demonstrating potential benefit in patients with pneumococcal or *H. influenzae* meningitis. However, it should be discontinued if the diagnosis of the above two types of bacterial meningitis were excluded.
- Patient with suspected or proven meningococcal meningitis should remain on droplet precautions for 24 hours while on appropriate therapy

### Differential:

- Encephalitis: inflammation of brain parenchyma with clinical evidence of neurologic dysfunction
  - Viruses are most common reported pathogens
  - HSV should always be considered and acyclovir should be initiated empirically

## Antibiotic Therapy:

- Ensure that maximal doses of antimicrobials are used
- For severe beta lactam allergy (e.g. anaphylaxis), please consult ID immediately
- General duration (depending on organism and clinical picture):
  - *S.pneumoniae*: 10 – 14 days
  - *N.meningitidis*: 7 days (consider prophylaxis in high risk exposures)
  - Aerobic gram negative bacilli: 21 days
  - *L. monocytogenes*: 21 days
  - *S.agalactiae* (GBS): 14-21 days
  - Herpes simplex virus encephalitis: 21 days

Pathogens associated with community-acquired meningitis and empiric antimicrobial therapy:

Predisposing factor	Common Bacterial Pathogens	Empiric Therapy *should target therapy once culture and sensitivities are available*
< 1 month	<i>Streptococcus agalactiae</i> (GBS), <i>Escherichia coli</i> , <i>Listeria monocytogenes</i> , <i>Klebsiella</i> species	Ampicillin + cefotaxime OR Ampicillin + aminoglycoside
1 – 23 months	<i>Streptococcus pneumoniae</i> , <i>Neisseria meningitidis</i> , <i>S. agalactiae</i> (GBS), <i>Hemophilus influenzae</i> , <i>E.coli</i>	Ceftriaxone + vancomycin
2 – 50 years	<i>N.meningitidis</i> , <i>S. pneumoniae</i>	Ceftriaxone + vancomycin
>50 years	<i>S. pneumoniae</i> , <i>N. meningitidis</i> , <i>L. monocytogenes</i> , aerobic gram negative bacilli	Ceftriaxone + vancomycin + ampicillin
Basilar skull fracture	<i>S. pneumoniae</i> , <i>H.influenzae</i> , Group A streptococci	Ceftriaxone + vancomycin
Penetrating trauma	<i>Staphylococcus aureus</i> , coagulase-negative staphylococci, aerobic gram negative bacilli (including <i>Pseudomonas aeruginosa</i> )	Ceftazidime + vancomycin  <i>*other options may include meropenem. ID consult is recommended</i>
Post neurosurgery	Aerobic gram-negative bacilli (including <i>Pseudomonas aeruginosa</i> ), <i>S.aureus</i> , coagulase-negative staphylococci	Ceftazidime + vancomycin  <i>*other options may include meropenem. ID consult is recommended</i>
CSF shunt	Coagulase negative staphylococci, <i>S.aureus</i> , aerobic gram negative bacilli (including <i>P.aeruginosa</i> ), <i>Propionibacterium acnes</i>	Ceftazidime + vancomycin  <i>*other options may include meropenem. ID consult is recommended</i>
Immunocompromised (post-transplant, HIV, steroids)	Fungi (e.g. <i>Cryptococcus</i> )	

## Adult Drug Dosages

(for pediatric dosages, please refer to *MacPeds Pediatric Survival Guide* or *Neonatal Drug Dosing Handbook*)

Drug	Doses	Renal dosage adjustment (please consult pharmacist)
Acyclovir	10mg/kg IV q8h (based on ideal body weight)	Yes
Ampicillin	2g IV q4h	Yes
Ceftriaxone	2g IV q12h	No
Ceftazidime	2g IV q8h	Yes
Vancomycin	25mg/kg IV x 1 as loading dose followed by 15mg/kg IV q8h	Yes
Dexamethasone	0.15mg/kg [maximum 10mg] IV q6h x2-4 days **should be given 15-20 minutes BEFORE antibiotics or with first dose of antibiotics	No

## Post-Exposure Prophylaxis

For meningitis caused by *Neisseria meningitidis*, consider post-exposure prophylaxis in exposed individuals [refer to document titled Post-Exposure Prophylaxis (PEP)].