MICHIGAN MEDICINE
UNIVERSITY OF MICHIGAN

GUIDELINE FOR TREATMENT OF BACTERIAL MENINGITIS IN ADULTS

Patient Population & Common Pathogens	Empiric Treatment Regimen	Duration of Therapy	Comments & Reference
Age >18 *N. meningitidis* *S. pneumoniae* *L. monocytogenes* (age >50) Aerobic GNR (age >50)	1st line: **Ceftriaxone** 2 g IV q12h + **Vancomycin*** IV (see nomogram, AUC goal 400-600) + **Dexamethasone** 10 mg IV q6h	*N. meningitidis* 7 days *H. influenzae* 7 days *S. pneumoniae* 10-14 days Aerobic GNRs 21 days *L. monocytogenes* ≥21 days	• Dexamethasone should be administered 10-20 min before antimicrobial therapy for maximal efficacy. Continue for 2-4 days for pneumococcal meningitis • Avoid piperacillin-tazobactam due to poor CNS penetration • Use adjusted body weight for obese patients to calculate acyclovir dose: Adjusted body weight = 0.4(Actual Weight – Ideal Weight) + Ideal Weight • Adjust vancomycin, meropenem, acyclovir, TMP-SMX and aztreonam in patients with renal dysfunction • CT prior to lumbar puncture if: ○ Immunocompromised ○ History of CNS disease (mass lesion, stroke) ○ New onset seizures ○ Papilledema ○ Abnormal level of consciousness ○ Focal neurologic deficit
If immunosuppressed, pregnant or >50 yo, add coverage for Listeria	Add **Ampicillin*** 2 g IV q4h to the above regimen		
If encephalopathic with suspicion for HSV	Add **Acyclovir*** 10 mg/kg IV q8h		
If allergies to 1st line therapy:	Non-life threatening penicillin or cephalosporin allergy: Substitute **meropenem*** 2 g IV q8h for ceftriaxone (meropenem will cover listeria in patients >50 yo) Substitute **TMP-SMX*** 5 mg/kg IV q8h for ampicillin if Listeria coverage when immunosuppressed or >50 yo. TMP-SMX may not be indicated in pregnancy. Consult ID for recommendations		
Life threatening penicillin allergy:	Substitute **aztreonam*** 2 g IV q6h for ceftriaxone		

<table>
<tr><th>Patient Population & Common Pathogens</th><th>Empiric Treatment Regimen</th><th>Duration of Therapy</th><th>Comments & Reference</th></tr>
<tr><td>Basilar skull fracture
S. pneumoniae
H. influenzae
Group A strep</td><td>1st line:
Ceftriaxone 2 g q12h
+ Vancomycin* IV (see nomogram, AUC goal 400-600)

If non-life threatening penicillin or cephalosporin allergy:
Substitute meropenem* 2 g IV q8h for ceftriaxone (meropenem will cover Listeria in patients >50 yo)

If life threatening penicillin allergy:
Substitute aztreonam* 2 g IV q6h for ceftriaxone</td><td rowspan="4">At least
7-21 days</td><td rowspan="4">• Patients with significant barrier disruption are at increased risk resistant-gram negative organisms thus requiring broadening of ceftriaxone to cefepime

• CSF shunt infections: Gold standard for infection clearance is removal of shunt. Prior to replacement of shunt, cultures should be negative for:
○ CoNS + normal CSF findings: 3 days
○ CoNS + abnormal CSF findings: 7 days
○ S. aureus: 10 days
○ Gram negative bacilli: 10-14 days (plus)

• Adjust cefepime vancomycin, meropenem, and aztreonam in patients with renal dysfunction

• CT prior to lumbar puncture if:
○ Immunocompromised
○ History of CNS disease (mass lesion, stroke)
○ New onset seizures
○ Papilledema
○ Abnormal level of consciousness
○ Focal neurologic deficit

* Adjust dose based on renal function</td></tr>
<tr><td>Penetrating trauma
S. aureus
Coag-negative Staphylococci
Aerobic gram-negative bacilli (e.g., Pseudomonas)</td><td>1st line:
Vancomycin* IV (see nomogram, AUC goal 400-600)
+ Cefepime* 2 g IV q8h

If non-life threatening penicillin or cephalosporin allergy:
Substitute meropenem* 2 g IV q8h for cefepime

If life threatening penicillin allergy:
Substitute aztreonam* 2 g IV q6h for cefepime</td></tr>
<tr><td>Post neurosurgery
Aerobic gram-negative bacilli (e.g., Pseudomonas)
S. aureus
Coag-negative Staphylococci</td><td>1st line:
Vancomycin* IV (see nomogram, AUC goal 400-600)
+ Cefepime* 2 g IV q8h

If non-life threatening penicillin or cephalosporin allergy:
Substitute meropenem* 2 g IV q8h for cefepime

If life threatening penicillin allergy:
Substitute aztreonam* 2 g IV q6h for cefepime</td></tr>
<tr><td>Presence of CSF shunt
Aerobic gram-negative bacilli (e.g., Pseudomonas)
S. aureus
Coag-negative Staphylococci
Propionibacterium acnes</td><td>1st line:
Vancomycin* IV (see nomogram, AUC goal 400-600)
+ Cefepime* 2 g IV q8h

Non-life threatening penicillin or cephalosporin allergy:
Substitute meropenem* 2 g IV q8h for cefepime

Life threatening penicillin allergy:
Substitute aztreonam* 2 g IV q6h for cefepime</td></tr>
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Antimicrobial Subcommittee Approval: N/A	Originated: Unknown
P&T Approval: N/A	Last Revised: 03/2021
Revision History: 03/21: Updated vancomycin dosing & hyperlinks	

The recommendations in this guide are meant to serve as treatment guidelines for use at Michigan Medicine facilities. If you are an individual experiencing a medical emergency, call 911 immediately. These guidelines should not replace a provider's professional medical advice based on clinical judgment, or be used in lieu of an Infectious Diseases consultation when necessary. As a result of ongoing research, practice guidelines may from time to time change. The authors of these guidelines have made all attempts to ensure the accuracy based on current information, however, due to ongoing research, users of these guidelines are strongly encouraged to confirm the information contained within them through an independent source

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