

# PEDIATRIC MENINGITIS GUIDELINE

## Exclusion Criteria

- Premature infants at less than 37 weeks corrected gestational age
- Recently hospitalized patients
- Patients with significant comorbidities

## Special Considerations for Pediatric Infectious Disease Consultation

- Encephalitis
- Recent neurosurgery
- VP shunt
- CSF leak
- Penetrating head trauma
- Allergy to beta-lactams
- Allergy to vancomycin

## Laboratory Studies

Labs	When to order?	Special comments
CSF cell count, glucose, protein and bacterial culture with gram stain	All CSF samples	
HSV 1 and 2 DNA – PCR of CSF	High clinical suspicion for HSV (see considerations below)	Also available on M/E Panel
Meningitis/Encephalitis (ME) Panel	All CSF samples EXCEPT – VPS, head trauma, brain abscesses, or high concern for HSV only	Includes CMV, Enterovirus, HSV1, HSV2, HHV 6, N. meningitidis, Parechovirus, VZV, E. coli K1, H. influenzae, L. monocytogenes, S. agalactiae, S. pneumoniae, C. neoformans/gattii
Miscellaneous Lab	If want other studies, e.g. EBV, West Nile, autoimmune studies, Neurologic Surveillance Testing via Public Health	Label Miscellaneous Lab as “Extra CSF for additional CSF studies”, EBV PCR, West Nile IgM

## Empiric Antibiotics for Meningitis

Age	Medications	Notes
0 – 2 months	Ampicillin + Ceftazidime +/- Acyclovir <sup>^</sup>	Based on gram stain results: if concerned for E coli, consider ceftazidime + gentamicin or meropenem (requires ID authorization) + gentamicin. If concerned for GBS or Listeria, consider ampicillin + gentamicin or penicillin G + gentamicin
>2 months – 18 years	Ceftriaxone + Vancomycin +/- Acyclovir <sup>^</sup>	

## <sup>^</sup>Considerations for HSV

0 – 2 months	>2 months – 18 years
<p>If HSV is a consideration, send CSF for HSV PCR or ME panel, hepatic function panel and PCR of blood (send out lab). Perform HSV surface cultures after 24hrs of life. Add Acyclovir if any of the following are present on history/exam or lab findings:</p> <ul style="list-style-type: none"> <li>Seizures or other neurologic signs</li> <li>Vesicles/rash</li> </ul>	<p>Strongly consider sending HSV-PCR and add Acyclovir if any of the following are present:</p> <ul style="list-style-type: none"> <li>Signs of encephalitis (altered mental status, headache, etc)</li> </ul> <p>OR</p>

<ul style="list-style-type: none"> <li>Sepsis-like picture (transaminitis, fever, hypothermia, lethargy, respiratory distress, apnea, abdominal distension, hepatomegaly, thrombocytopenia)</li> <li>CSF: lymphocyte predominance, normal/minimally-low glucose, normal/minimally-elevated protein, presence of red blood cells with non-traumatic tap</li> <li>OR any other concerns for HSV</li> </ul> <p><i>Note: Mother may have no history of symptomatic HSV. Perinatally acquired HSV infection usually presents at 4-21 days of age so addition of acyclovir for newborns at &lt;72 hours of age in the absence of the above should not be routine</i></p>	<ul style="list-style-type: none"> <li>Seizures or focal neurologic signs</li> </ul> <p>AND</p> <ul style="list-style-type: none"> <li>CSF parameters suggestive of viral process: lymphocyte predominance, normal/minimally-low glucose, normal/minimally-elevated protein, presence of red blood cells with non-traumatic tap</li> </ul>
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## Dosing of Medications for Meningitis

- Neonates and Infants ( $\leq 2$  months old)**

	0 – 7 days old	8 – 28 days old	29 days – 2 months
<b>Ampicillin</b>	100mg/kg q8h (300mg/kg/day)	75 mg/kg q6h (300mg/kg/day)	75-100mg/kg q6h (300-400mg/kg/day)
<b>Ceftazidime</b>	50 mg/kg q8h or q12h (100-150mg/kg/day)	50 mg/kg q8h (150mg/kg/day)	50 mg/kg q8h (150mg/kg/day)
<b>Gentamicin*</b>	4 mg/kg q24h	4 mg/kg q12-24h	1- 2.5 mg/kg q8h
<b>Acyclovir*</b>	20 mg/kg IV q8h	20 mg/kg IV q8h	20 mg/kg IV q8h


\*May require renal dose adjustment

- Infants (>2 months old), children, and adolescents**

Medication	Dose
<b>Ceftriaxone</b>	50 mg/kg q12h (max 2g/dose)
<b>Vancomycin*</b>	15-20 mg/kg q6h (max 1500mg/dose)
<b>Acyclovir*</b>	$\geq 3$ months – <12 years old: 10-15 mg/kg IV q8h >12 years old: 10 mg/kg IV q8h

\*May require renal dose adjustment

## Duration of Therapy

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- *S. pneumoniae* – 10-14 days
  - *N. meningitidis* – 5-7 days
  - *H. influenzae* type b – 10 days
  - GBS – 14-21 days
  - *L. monocytogenes* – 14-21 days
  - Gram-negative bacilli – 21 days minimum
  - HSV – 21 days minimum AND a negative PCR

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