

Bacterial Meningitis in Children and Adolescents: A Practical Real-World Approach

Infants > 28 days, children, and adolescents with suspected acute bacterial meningitis

Suspect bacterial meningitis and identify red flags

Infants: nonspecific illness, irritability/lethargy, poor feeding, vomiting, apnea, bulging fontanelle. Older children/adolescents: fever, headache, neck stiffness, photophobia, vomiting, altered mental status. Non-blanching rash → suspect meningococcal disease. High-risk background: incomplete immunization, asplenia, complement deficiency, prior meningitis, CSF leak, cochlear implant

When lumbar puncture should be delayed

- Shock
- Uncontrolled seizures
- Respiratory compromise
- Bleeding risk
- Extensive/rapidly spreading purpura
- Infection at the LP site
- New focal neurologic signs or posturing
- Abnormal pupillary reactions
- GCS ≤9 or rapidly falling consciousness
- Suspected space-occupying lesion

YES

Is lumbar puncture (LP) safe now?

NO

Perform lumbar puncture promptly

CSF cell count, protein, glucose, lactate, Gram stain, culture, PCR if available

Obtain blood tests and start IV antibiotics immediately after LP

Blood culture, CBC, CRP and/or procalcitonin, blood glucose, molecular tests if available

Start empiric antibiotic therapy within 1 hour of hospital arrival

Vancomycin 60 mg/kg/day IV + ceftriaxone 100 mg/kg/day IV or cefotaxime 300 mg/kg/day IV; Adapt empiric therapy to local resistance patterns; add ampicillin/amoxicillin if Listeria risk factors are present

Adjunctive dexamethasone

Consider with or just before first antibiotic dose; Do not delay antibiotics to give dexamethasone. Continue only if pneumococcal or Hib disease is confirmed

Supportive management

Admit for close monitoring. Treat shock, hypoxia, seizures, and metabolic abnormalities. Use isotonic fluids; Do not routinely restrict fluids below maintenance. Monitor sodium and SIADH. Use droplet precautions, notify infection control/public health and arrange contact prophylaxis if meningococcal disease or Hib is suspected/confirmed

Do not delay treatment

Obtain blood cultures first
Start IV antibiotics immediately
Stabilize airway, breathing, circulation
Control seizures and shock
Perform LP as soon as it is safe
If imaging is indicated, give antibiotics before imaging

Complications to monitor during the first 48–72 hours

- Seizures
- Raised intracranial pressure (ICP)
- SIADH / hyponatremia
- Subdural effusion/empyema
- Brain abscess
- Hydrocephalus
- Septic shock

NO

Is the causative organism identified?

YES

Continue empiric treatment and reassess clinical response

If cultures remain negative and CSF is normal, consider stopping antibiotics after 48–72 h if suspicion is low. If CSF is abnormal or concern persists, continue treatment and reconsider the diagnosis

Modify treatment according to pathogen and susceptibility

Streptococcus pneumoniae

Tailor to susceptibility; ceftriaxone/cefotaxime if susceptible; vancomycin + high-dose cephalosporin if reduced susceptibility/resistance; ID input for resistant isolates; 10–14 d

Neisseria meningitidis

Ceftriaxone or cefotaxime; 5–7 d

Haemophilus influenzae

Ceftriaxone or cefotaxime; 7–10 d

Gram-negative bacilli / *Listeria*

ID input; often longer courses, around 21 d

Reassess after 24–36 hours

Clinical improvement?
Persistent fever?
Ongoing seizures?
New focal neurologic signs?
Positive blood or CSF cultures?

Poor response or concern for complication?

NO

YES

Repeat Evaluation:

Consider MRI (preferred) or urgent CT if persistent fever, seizures, focal deficits, encephalopathy, raised ICP, or suspected abscess/empyema/hydrocephalus/thrombosis. Consider repeat LP when clinically indicated

Discharge planning and follow-up

Hearing evaluation at discharge or shortly afterward. Pediatric follow-up at 4–6 weeks. Monitor neurologic, cognitive, developmental, and psychosocial outcomes. Consider evaluation for immunodeficiency and/or CSF leak, especially after recurrent or pneumococcal meningitis

Continue targeted therapy and prepare discharge follow-up

Key points:

- Antibiotics should not be delayed.
- LP should be performed before antibiotics whenever safe, but treatment takes priority.
- Routine neuroimaging before LP is not recommended.
- Empiric therapy should cover meningococcus and resistant pneumococcus.
- Hearing and neurodevelopmental follow-up are essential

References:

1. WHO guidelines on meningitis diagnosis, treatment and care. Geneva: World Health Organization; 2025.
2. National Institute for Health and Care Excellence (NICE). Meningitis (bacterial) and meningococcal disease: recognition, diagnosis and management. NICE guideline [NG240]. London: NICE; 2024. Published March 19, 2024. Available: <https://www.nice.org.uk/guidance/ng240>

Author:

Marco Aurelio Palazzi Safadi, MD, PhD.
ORCID: 0000-0002-4401-9446
masafadi@uol.com.br
Santa Casa de Sao Paulo School of Medical Sciences.