Meningitis Algorithm

Recognition

- Consider in any ill-appearing child
- Consider in infants with fever/hypothermia, lethargy, irritability, seizures or non-specific signs (poor feeding, vomiting, diarrhea)
- Consider in children/adolescents with fever, altered LOC, neck stiffness, headache, meningeal signs, petechial or purpuric rash

Initial Stabilization & Management

- Assess and manage ABCDs
- Start IVF (maintenance +/- bolus as required)
- Measure point of care glucose
- Assess for signs of raised ICP
- Treat fever
- Measure CBC with differential, blood culture, CRP, lactate, glucose, electrolytes, urea, creatinine, blood gas, PTT, INR, procalcitonin (if available). Add urinalysis, urine culture, or Lyme serology (if appropriate).

Contact Pediatric Referral Centre

CT Head RARELY needed. Consider only if:

1. Suspicion of space-occupying lesion (focal/ refractory seizures, focal neurological deficit, immunodeficiency)
   OR
2. Signs of raised ICP: progressive obtundation, papilledema, Cushing's triad (hypertension, bradycardia, abnormal respirations)

Lumber Puncture (LP)

- Perform LP as long as no respiratory/cardiovascular instability, skin infection at LP site, coagulopathy/severe thrombocytopenia or concern for raised ICP.
- Use topical or local analgesia to increase LP success and consider sedation as needed.
- Send CSF for cell count, Gram stain, culture and sensitivity, protein, glucose, HSV PCR (if clinical suspicion), PCR panel (if available).
- Interpret CSF results.

Treat Raised ICP

- Elevate head of bed to 30°.
- Maintain normocapnea. Brief hyperventilation is indicated for acute herniation.
- Avoid hypotension to maintain cerebral perfusion pressure.
- Give 3% NaCl 5ml/kg (MAX 250 ml) IV over 10 min **OR** mannitol 0.5-1 g/kg (MAX 100 g) IV over 15 minutes.
- If seizure activity, refer to TREKK Pediatric Status Epilepticus Algorithm.

Antimicrobials

Administer antimicrobials within 60 minutes of concern for meningitis.
DO NOT delay antimicrobials if LP is delayed or unsuccessful.

Meningitis Treatment for full-term neonates, infants, children, adolescents*		
Age	**Antimicrobial**	**Steroid**
0 – 7 days old	Ampicillin 225 mg/kg/day IV divided q8h **AND** Cefotaxime 100 – 150 mg/kg/day IV divided q8h	Not recommended
8 – 28 days old	Ampicillin 300 mg/kg/day IV divided q6h **AND** Cefotaxime 150 - 200 mg/kg/day IV divided q6h	
29 days or older	Ceftriaxone 100 mg/kg/dose (MAX 2000 mg/**dose**) IV x 1 then 12 hours later start 50 mg/kg/**dose** (MAX 2000 mg/dose) IV q12h **AND** Vancomycin 60 mg/kg/day (MAX 1000 mg/dose) IV q6h prior to levels **If immunocompromised, add** Ampicillin 300 mg/kg/day (MAX 3000 mg/dose) IV divided q6h	**>2 months**, consider Dexamethasone 0.15 mg/kg/**dose** (MAX 10 mg/**dose**) IV q6h x 4 days. Give 20 minutes prior to or at the same time as first dose of antibiotics. Steroids have been shown to ↓ hearing loss & neurologic sequalae but do not change survival rates in high-income countries.
Additional Treatment Considerations		
Consult Infectious Disease specialist if Gram negative bacteria identified on Gram stain		
HSV Encephalitis suspected	Acyclovir** ≤ 3 months of age give 60 mg/kg/day IV divided q8h > 3 months to less than 12 years of age give 45 mg/kg/day (MAX 1000 mg/dose) IV divided q8h ≥ 12 years of age give 30 mg/kg/day (MAX 1000 mg/dose) IV divided q8h	
Lyme Disease suspected	Ceftriaxone 75 mg/kg/day (MAX 2000 mg/dose) IV q24h **OR** Doxycycline 2.2 mg/kg/**dose** (MAX 100 mg/dose) PO BID	

**Please contact Pediatric Referral Centre for pre-term neonates born under 37 weeks gestational age.*
***Ensure adequate hydration with at least maintenance IV fluids to minimize risk of nephrotoxicity.*

Disposition

- Arrange **transfer** or **admit to hospital** as per local guidelines
- PICU generally required for hemodynamic and/or airway compromise/altered LOC
- Monitor for complications: sepsis, shock, hypoglycemia, raised ICP, SIADH, seizures

Scan or click the QR code to learn more, to see a list of key references, and development team members.

TRANSLATING EMERGENCY KNOWLEDGE FOR KIDS

*Visit **trekk.ca** for more resources related to pediatric emergency care.*