



Meningitis is **inflammation of the meninges.**



RISK FACTORS



- Unimmunized
- Immunocompromised
- Age < 5 years old
- Crowded living conditions

PATHOGENESIS:



Bacteria colonize the nasopharynx



Bacteria invade into the bloodstream



Bacteria are transported to the CSF through the bloodstream

Bacteria replicate in the CSF

COMMON PATHOGENS

NEONATES (0-28 days)

- Group B strep
- E. coli
- Listeria



1-3 MONTHS

- Group B strep
- S. pneumoniae
- N. meningitidis

> 3 MONTHS

- S. pneumoniae (SP)
- N. meningitidis (NM)
- H. influenzae

Viral: enterovirus, parechoviruses, HSV

CLINICAL PRESENTATION

INFANTS

- Irritability
- Fever/hypothermia
- Seizures
- Lethargy
- Hypotonia
- Poor feeding

> 1 YEAR OLD

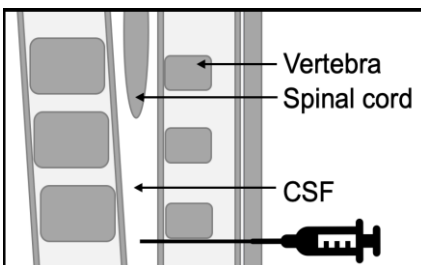
- Headache**
- Fever**
- Neck stiffness**
- Photophobia
- Nausea and vomiting
- Confusion
- Irritability
- Anorexia
- ↓ LOC
- Seizures

INVESTIGATIONS

- Lumbar puncture**
- Blood cultures
- CT or MRI head
- CBC, CRP, electrolytes, Cr, glucose

4 tubes:

- Gram stain & bacterial culture
- Glucose & protein
- Cell count & differential
- Viral PCR



PREVENTION

- ✓ Haemophilus influenzae type b (Hib) vaccine
- ✓ Pneumococcal conjugate vaccine (PCV13)
- ✓ Pneumococcal polysaccharide vaccine
- ✓ Meningococcal conjugate vaccine



TREATMENT

Empiric antibiotic therapy:

- Neonates:** ampicillin (*Listeria*) + cefotaxime (*GBS, E. coli*)
- > 1 month:** ceftriaxone (*NM, SP*) + vancomycin (resistant *SP*) +/- ampicillin (immunocompromised)

- Narrow antibiotic** based on susceptibilities
- Acyclovir** if HSV suspected
- Consider adjuvant **corticosteroids**

COMPLICATIONS OF MENINGITIS

- Hearing loss
- Brain damage
- Seizures
- Gait problems
- Learning disabilities
- Memory difficulty
- Kidney failure

A hearing test is needed within 1 month of discharge.