**Meningitis**

Risk factors

* Extremes of age, specifically neonates & elderly
* “close contacts” => those living in dormitorities
* Immunocompromised => alcoholics, HIV, diabetics, hepatic / renal dysfunction
* Any exposure of meninges to “outside world” => neurosurgery, CSF shunts, basal skull fractures, penetrating head trauma

Pathogenic Causes

* Aseptic
  + Viral: Enterovirus, HSV, Varicella, HIV
  + Others: syphilis (Treponema pallidum), M. pneumonia, Rocky mountain spotted fever
* Bacterial
  + Infants: Gp B Strep, E Coli, Listeria
  + Children / Adults: H Influenzae, N meningitidis, S penumoniae
  + Elderly / immunocompromised / alcoholics: Same as above in adults + aerobic Gm neg bacilli
  + Penetrating trauma, post neurosurgery, CSF shunts: S aureus, coagulase neg staph, aerobic Gm neg bacilli (including pseudomonas)

Clinical Findings of bacterial meningitis

* Fever, neck stiffness, altered mental status & headache (2 of the prev = 95% sensitivity)
* Photophobia
* Petechial rash
* Seizure
* Focal neurologic signs
* Papilledema
* Meningismus (Brudzinski / Kernig)

When to do CT before LP

* Adult with new onset seizures
* Focal neurological findings
* Mod to severe impaired level of consciousness
* Papilledema
* Known CNS diseases including CSF shunts, hydrocephalus, trauma, recent neurosurgery, immunocompromised
* Delay in ability to perform LP

\*\*if need to delay LP for CT, obtain blood cultures and start empiric antibiotics. If suspicious for bacterial meningitis, start dexamethasone 20 mins before antibiotics.

Typical CSF Findings in Meningitis

|  |  |  |  |
| --- | --- | --- | --- |
| **Pathogen** | **WBC (per mcL)** | **Glucose** | **Protein (G/L)** |
| **Bacterial** | >500 (mostly neutrophils) | Low | >100 |
| **Partially treated bacterial** | >100 | Normal | >70 |
| **Aseptic, often viral** | 10-1000 (mostly lymphocytes) | Normal | <200 |

Empiric Antibiotic Therapy

* Neonates: ampicillin + cefotaxime
* Adults: vancomycin + ceftriaxone
* Immunocompromised adults (age > 50 yo, altered cellular immunity, alcoholics): ampicillin + vancomycin + ceftriaxone
* Basilar skull fracture or cochlear implant: vancomycin + ceftriaxone
* Neurosurgery + CSF shunt + penetrating trauma: vancomycin + cefepime

Prevention

* H. influenza type B vaccine
* Conjugate meningococcal vaccine
* Conjugate pneumococcal vaccine

Prophylaxis

* Prescribe antibiotics for the following close contacts
  + Anybody in close contact with pt x 8 hrs
  + Contact oral secretions
  + Living in household with 1 or more unvaccinated or incompletely vaccinated children