BACTERIAL MENINGITIS

- Incidence of 3-5/100,000/year in US
- More than 1500 death/yr in US

Causes of Bacterial Meningitis

Three common bacteria:
- Haemophilus influenza type b (Hib)
- Neisseria meningitidis
  - Causes Meningococcal Meningitis
- Streptococcus pneumoniae

Causes Pneumococcal Meningitis

How do people get Bacterial Meningitis?

- Bacteria are spread through direct contact with secretions from the nose or throat of an infected person
- None of the bacteria that cause meningitis are very contagious
- Not spread by casual contact or by simply breathing the same air where the person infected has been
## Signs and Symptoms

- **Under Age 2**
  - Fever
  - Headache
  - Stiff neck
  - Inactivity
  - Vomiting
  - Poor feeding
  - Seizures
    - May be hard to detect in infants

- **Over age 2**
  - High fever
  - Headache
  - Stiff neck
  - Nausea and vomiting
  - Sensitivity to light
  - Confusion
  - Sleepiness
  - Petechiae that spreads rapidly
  - Seizures

### Kernig's Sign

![Kernig's sign](image)

### Brudzinski's Neck Sign

![Brudzinski's sign](image)

## Treatment

<table>
<thead>
<tr>
<th>Age of patient</th>
<th>Likely organism</th>
<th>Antimicrobial therapy*</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-12 weeks</td>
<td>Group B Strep</td>
<td>3rd generation cephalosporin + ampicillin (+ dexamethasone first 2 days in &gt;4-8-week-old infant)</td>
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<tr>
<td></td>
<td>E. Coli</td>
<td></td>
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<tr>
<td></td>
<td>L. Monocytogenes</td>
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<tr>
<td>3 months-50 years</td>
<td>S. Pneumoniae</td>
<td>3rd generation cep + vancomycin (± ampicillin)</td>
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<tr>
<td></td>
<td>N. meningitidis</td>
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<tr>
<td></td>
<td>H. influenzae</td>
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<tr>
<td>&gt;30 years</td>
<td>S. Pneumoniae</td>
<td>3rd generation cep + vancomycin + ampicillin</td>
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<tr>
<td></td>
<td>L. Monocytogenes</td>
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<tr>
<td></td>
<td>Gram-neg. bacilli</td>
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</tr>
<tr>
<td>Base of skull fracture</td>
<td>Staphylococci</td>
<td>3rd generation cephalosporin + vancomycin</td>
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<td></td>
<td>Gram-neg. bacilli</td>
<td></td>
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<tr>
<td></td>
<td>S. pneumoniae</td>
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</tr>
<tr>
<td>Immuno-compromised state</td>
<td>L. Monocytogenes</td>
<td>Vancomycin + ampicillin + cefazidime</td>
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<tr>
<td></td>
<td>Gram-neg. bacilli</td>
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<tr>
<td></td>
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</table>
Treatment
- Usually Third Generation Cephalosporins are the treatment of choice in Bacterial meningitis.
- 4-6 days of Intravenous dexamethasone is recommended to hasten the recovery.

Vaccinations
- Hib vaccine (3 doses by 6 months of age and a booster between 12-18 months of age)
- Meningococcal vaccine not routinely given to civilians in U.S. because most outbreaks occur in Africa
- Pneumococcal vaccine ineffective in persons under age 2
- Recommended for all persons over age 65 with certain medical problems

Chronic Meningitis
- Usually caused by Mycobacterium tuberculosis, fungi, or protozoan parasites.
- Characterized by fever, headache, stiff neck and back, nausea, and vomiting

Tuberculous meningitis
- In underdeveloped countries with higher overall incidence of TB, TB meningitis is more of a pediatric disease whereas in developed countries with lower incidence of TB, bacterial meningitis is more of an adult disease.

Pathogenesis
- TB Bacillemia (primary or late reactivation) → subependymal tubercles → rupture into the subarachnoid space → meningitis

Clinical Presentation

3 Stages
1. Pts lucid at presentation w/o focal neurologic signs or hydrocephalus; prodromal, lasts 2-3 wks and characterized by insidious onset of malaise, HA, low-grade fever
2. Meningitic phase w/o meningismus, lethargy, confusion, CN palsies, hemiparesis
3. Paralytic phase – advance to stupor, coma, seizure, hemiparesis.

Most common clinical findings:
- Fever
- HA
- Vomiting
- Nuchal Rigidity
- AMS
- CN Palsies, esp CN III

**Treatment: Antimicrobial Therapy**
- Start as soon as there is suspicion for TB meningitis
- Same Guidelines as those for pulmonary TB
- Intensive Phase: 4 drug regimen of Isoniazid, Rifampin, Pyrazinamide, and Ethambutol or Streptomycin for 2 months
- Continuation Phase: Isoniazid and Rifampin for another 7 – 10 months

**Treatment: Adjunctive Therapy**
- Glucocorticoids Indicated with:
- rapid progression from one stage to the next
- elevated OP on LP, CT evidence of cerebral edema
- worsening clinical signs after starting ATT, increased basilar enhancement, or moderate to advancing hydrocephalus on head CT
- Glucocorticoid Dosing: Dexamethasone 12 mg/d x 3 weeks followed by a slow taper
- Surgery: Ventriculostomy placement

*Thank you*