Meningitis: By Prof. Dr. Maha Adel

Meningitis is a bacterial or viral infection that causes three thin layers of tissue that surround the brain and the spinal cord to swell. Viral meningitis is more common and less severe. Bacterial meningitis may cause long term complications, including death. Treatment for bacterial meningitis includes antibiotics and early treatment can help prevent serious problems. There is no treatment for viral; most children recover on their own. Vaccines help prevent some forms of bacterial meningitis.

Causes of meningitis?

Meningitis is usually caused by a bacterial or viral infection that invades the cerebral spinal fluid (CSF), the fluid within the open spaces of the brain that protect and cushion the brain and spinal cord. A fungus or parasite may also cause meningitis. More specifically:

Bacteria that can cause meningitis include:

- Group B streptococcus
- Escherichia coli (or E. coli)
- Listeria monocytogenes
- Streptococcus pneumoniae
- Neisseria meningitides (meningococcal meningitis)
- Haemophilus influenzae type b or H. influenzae
- Syphilis
- Ttuberculosis (TB)

Viruses that can cause meningitis include:

- Polioviruses
- Mumps (paramyxovirus)
- Herpes simplex virus (HSV)

Other microorganisms that can cause meningitis are:

- Borrelia burgdorferi (Lyme disease)
- Fungi such as Candida, Aspergillus, or Cryptococcus neoformans

Transmission:

Bacterial meningitis can be spread through coughing or sneezing, kissing, or sharing drinks. In addition, you increase your chances of catching meningitis by:

- having been in close contact with someone who has bacterial meningitis (especially when it's due to meningococcus, a type of bacteria that is more contagious than others)
- having a compromised immune system
- having traveled to an area of the world where meningitis is widespread

Epidemiology

About 3,000 people in the United States — or one in 100,000 — are diagnosed with bacterial meningitis each year, most of them infants, children, college students, and the elderly.

Incidences of bacterial meningitis usually peak in the winter or early spring. The most common cause of bacterial meningitis in children, Haemophilus influenzae b (Hib), has been almost eliminated due to a vaccine that was developed at Boston Children's in 1990.

What are the symptoms of meningitis?

The symptoms of meningitis vary depending on what that caused the infection and the age of your child. They also may surface several days after your child has had a cold and runny nose, or diarrhea and vomiting. The child may not display all of the signs and symptoms.

The most symptoms include:

- In infants (symptoms may be difficult to identify)
    - irritability
    - fever
    - sleeping all the time
    - poor feeding
    - high-pitched cry
    - arching back
    - cries when picked up or being held
    - inconsolable crying
    - bulging fontanelle (soft spot on an infant's head)
    - noticeably different temperament
    - seizures
- **In children older than 1 year**
    - neck and/or back pain
    - headache
    - sleepiness
    - confusion
    - irritability
    - fever
    - refusing to eat
    - decreased level of consciousness
    - seizures
    - sensitivity to light
    - nausea and vomiting

- neck stiffness

Diagnosis of meningitis?

In addition to a complete medical history, physical exam, and blood tests, there is a need to perform other procedures to confirm meningitis, including:

Lumbar puncture (spinal tap)

- A special needle is placed into your child's lower back into the spinal canal.
- It measures the pressure in the spinal canal and brain.
- A small amount of cerebral spinal fluid (CSF) can be removed and sent for testing to determine if there is an infection or other problems.
- It wasn't recommended if child is very ill.

Computerized tomography scan

- Also called a CT or CAT scan
- It uses a combination of x-rays and computer technology to produce cross-sectional images (often called slices), both horizontally and vertically, of the body
- It shows detailed images of any part of the body, including the bones, muscles, fat, and organs.
- It is more detailed than general x-rays

Treatments for meningitis?

Early treatment with antibiotics can reduce swelling and inflammation in child's brain. Timing is crucial. If the child has symptoms of bacterial meningitis, it must be admitted to the nearest emergency room right away.

If someone is in close contact with a person who has bacterial meningitis, such as a roommate, parent, sibling, daycare worker, classmate, they are at an increased risk and should begin treated with antibiotics to prevent bacterial meningitis before symptoms occur.

Treatment depends on the type of meningitis, but can include:

Bacterial meningitis

- intravenous (IV) antibiotics
- the earlier the treatment starts, the better your outcome
- antibiotics can start before the results of the lumbar puncture are available
- a corticosteroid, or steroid, such as dexamethasone can decrease inflammation and reduce pressure that can build up in the brain

Viral meningitis

- Tylenol can relieve symptoms.
- With the exception of the herpes simplex virus, there are no medications to treat the organisms that cause viral meningitis.
- Most children with viral meningitis recover on their own without treatment.

Fungal meningitis

- anti-fungal intravenous (IV) medication

Tuberculosis (TB) meningitis

- a long course (one year) of medications
- usually involves several different medications for the first few months, followed by other medications

Prevention

Several vaccines are available to prevent some of the bacterial organisms that can cause meningitis, including:

- H. influenzae type b vaccine (Hib): given as a three or four-part series during child's routine immunizations, starting at 2 months
- Pneumococcal conjugate vaccine (PCV7): recommended by the American Academy of Pediatrics (AAP) for all children younger than age 2 and

children ages 24 to 59 months of age that are at very high risk for pneumococcal infection. PCV7 can be given along with other childhood vaccines at 2 months, 4 months, 6 months, and 12 to 15 months

- Meningococcal vaccine: for meningococcal meningitis, a very contagious form of bacterial meningitis. This vaccine is normally given during the routine pre-adolescent immunization visit (at 11 to 12 years).