

Essay on Meningitis

Meningitis is an inflammation of the protective membranes (meninges) covering the brain and spinal cord. The inflammation may be caused by infection with viruses, bacteria, or other microorganisms (fungi and parasites), but some can be due to certain medications or illnesses. Meningitis can be life-threatening because of the inflammation's proximity to the brain and spinal cord. Meningitis symptoms in babies and young children include fever, refusing feeds, fretfulness, being difficult to wake, purple–red skin rash or bruising, high moaning cry and pale or blotchy skin. Symptoms of meningitis in adults and older children include headache, fever, vomiting, neck stiffness and joint pains, drowsiness and confusion, purple–red skin rash or bruising and discomfort looking at bright lights (photophobia).

The organisms that cause bacterial meningitis may live in the nose and throat. People of any age can carry them without becoming ill, but they can infect others through coughing or sneezing. Meningitis caused by these bacteria is serious and requires very prompt medical attention. Some common examples of bacterial meningitis are: Haemophilus meningitis – caused by *Haemophilus influenzae* type b, meningococcal meningitis – caused by *Neisseria meningitidis*, and pneumococcal meningitis – caused by *Streptococcus pneumoniae*. In bacterial meningitis, bacteria reach the meninges by one of two main routes: through the bloodstream or through direct contact between the meninges and either the nasal cavity or the skin. In most cases, meningitis follows invasion of the bloodstream by organisms that have colonised and invaded mucosal surfaces such as the nasal cavity. This is often preceded by viral infections of the upper respiratory tract which break down the normal barrier provided by the mucous surfaces. Subsequently, they enter the subarachnoid space in places where the blood–brain barrier is vulnerable; such as the choroid plexus and cerebral capillaries. Direct contamination of the cerebrospinal fluid (CSF) may arise from indwelling devices, skull fractures, or infections of the nasopharynx or the nasal sinuses that have formed a tract with the subarachnoid space or congenital dural defects.

The inflammation that occurs in the subarachnoid space during meningitis is not a direct result of bacterial infection but can rather be attributed to the activation of the host immune system in response to the entrance of bacteria and their products into the central nervous system (CNS). When components of the bacterial cell membrane are released after autolysis or antibiotic treatment this will lead to increase inflammation, promote leukocyte migration to the CNS and enhance the release of proinflammatory cytokines, that recruit other immune cells and stimulate other tissues to participate in an immune response. The blood–brain barrier becomes more permeable, leading to vasogenic oedema. Large numbers of white blood cells enter the CSF, and release toxic substances causing cytotoxic oedema. Due to the high protein and cell content, the increased viscosity of the CSF leads to generation of interstitial oedema. The three forms of cerebral edema all lead to an increased intracranial pressure; together with the lowered blood pressure often encountered in acute infection, lead to neuronal injury and brain cells apoptosis.

Diagnosis of meningitis is dependent on examination and culture of CSF taken by lumbar puncture. The CSF of a patient with acute bacterial meningitis reveals a cloudy fluid, increase polymorphonuclear leucocytes count, a low glucose concentration in relation to serum value, a raised concentration of protein, and a positive Gram-stained smear and culture for the causative microorganism.

The treatment for meningitis is by the prompt application of antibiotics and sometimes, antiviral drugs. In some cases, corticosteroid drugs can be used to prevent complications from overactive inflammation. Meningitis can lead to serious long-term consequences such as deafness, epilepsy, hydrocephalus and cognitive deficits, especially if not treated quickly. Some forms of meningitis (such as those associated with meningococci, pneumococci or mumps virus infections) may be prevented by immunization.