



# Libyan International Medical University Faculty of Basic Medical Science

## Clinical Manifestations of Bacterial Meningitis

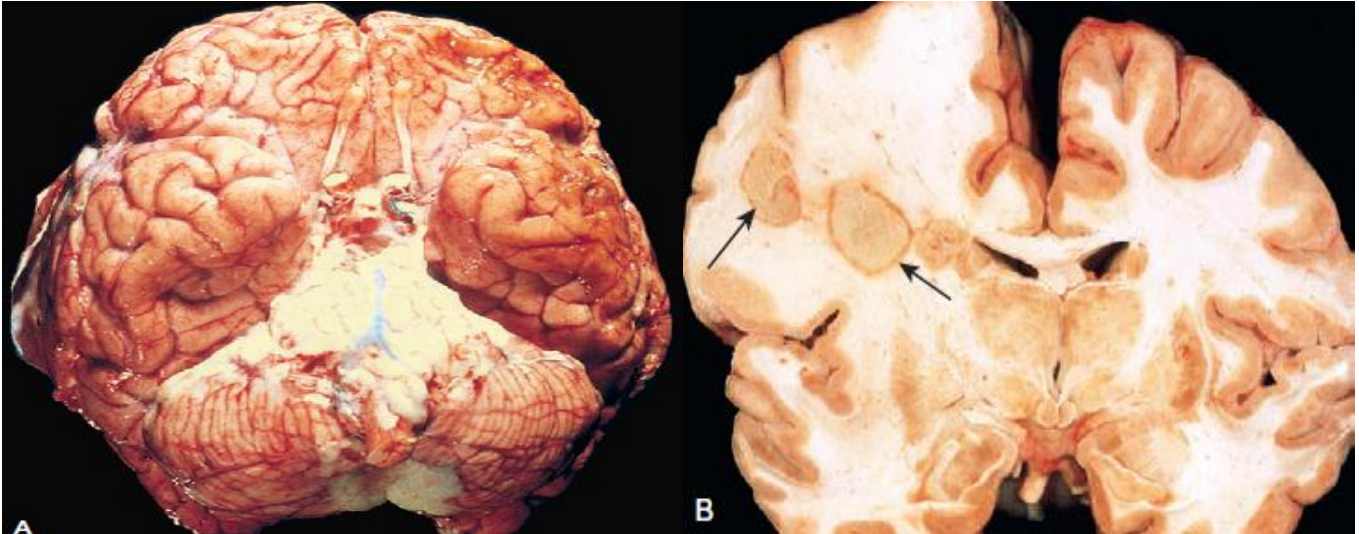
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**Date of submission:-** 4.3.2018

## Introduction:

In this report , I will discuss the clinical manifestations of bacterial Meningitis , because bacterial meningitis is more dangerous than any micro-organism that causes meningitis and can be deadly . Meningitis is an inflammation of the membranes (meninges) surrounding your brain and spinal cord. The swelling from meningitis typically triggers symptoms such as headache, fever and a stiff neck. Most cases of meningitis in the U.S. are caused by a viral infection, but bacterial and fungal infections are other causes. Some cases of meningitis improve without treatment in a few weeks. Others can be life-threatening and require emergent antibiotic treatment. Seek immediate medical care if you suspect that someone has meningitis. Early treatment of bacterial meningitis can prevent serious complications.



## Summary (Abstract):

Meningitis is an infection that causes inflammation of the membranes (meninges) caused by a bacterial, viral , fungal or protozoal infection .

The brain and spinal cord are covered by connective tissue layers collectively called the meninges which form the blood-brain barrier .

The primary functions of the meninges and of the cerebrospinal fluid (produced in and circulating in the meninges) is to protect, cushion, nourish, and support the brain and spinal cord .

Bacterial and viral are the two most common forms of meningitis . But bacterial meningitis is usually severe and can even be deadly . Death can occur in as little as a few hours. Most people recover from meningitis. However, permanent disabilities (such as brain damage, hearing loss ) can result from the infection .

Acute Pyogenic Meningitis (bacterial Meningitis)

Chronic Meningitis

Tuberculous Meningitis

There are several types of bacteria that can cause meningitis mainly caused by :

Streptococcus pneumonia

Neisseria meningitides

Haemophilus influenza

The bacteria enter the bloodstream (septicaemia) and then travel to the meninges. It's also possible to introduce bacteria directly in the meninges through sinus infections or ear infections .<sup>1</sup>

## **Discussion:**

Immediate complications of meningitis include the following:

- ❖ Septic shock, including disseminated intravascular coagulation (DIC)
- ❖ Coma with loss of protective airway reflexes
- ❖ Seizures, which occur in 30-40% of children and 20-30% of adults
- ❖ Cerebral edema
- ❖ Septic arthritis
- ❖ Pericardial effusion
- ❖ Hemolytic anemia (*H influenzae*)
- ❖ Delayed complications include the following:
  - ❖ Decreased hearing or deafness
  - ❖ Other cranial nerve dysfunctions
  - ❖ Multiple seizures
  - ❖ Focal paralysis
  - ❖ Subdural effusions
  - ❖ Hydrocephalus
  - ❖ Intellectual deficits
  - ❖ Ataxia
  - ❖ Blindness
  - ❖ Waterhouse-Friderichsen syndrome
  - ❖ Peripheral gangrene<sup>(2)</sup>

### **Cerebral edema, cranial nerve palsy, and cerebral infarction**

Some degree of cerebral edema is common with bacterial meningitis. This complication is an important cause of death.

Cranial nerve palsies and the effects of impaired cerebral blood flow, such as cerebral infarction, are caused by increased ICP. In certain cases, repeated LP or the insertion of a ventricular drain may be necessary to relieve the effects of this increase.

In cerebral infarction, endothelial cells swell, proliferate, and crowd into the lumen of the blood vessel, and inflammatory cells infiltrate the blood vessel wall. Foci of necrosis develop in the arterial and venous walls and induce arterial and venous thrombosis. Venous thrombosis is more frequent than arterial thrombosis, but arterial and venous cerebral infarctions can be seen in 30% of patients.

### **Brain parenchymal damage**

Brain parenchymal damage is the most important and feared complication of bacterial meningitis. It can lead to the following disorders:

Sensory and motor deficits

Cerebral palsy

Learning disabilities

Mental retardation

Cortical blindness

Seizures

### **Cerebritis**

Inflammation often extends along the perivascular (Virchow-Robin) spaces into the underlying brain parenchyma. Commonly, cerebritis results from direct spread of infection, either from otorhinologic infection or meningitis or from hematogenous spread from an extracranial focus of infection. Parenchymal involvement, with edema and mass effect, may be localized or diffuse. Cerebritis can evolve to frank abscess formation in the gray matter–white matter junction.<sup>(3)</sup>

**Conclusion:**

Meningitis is an acute inflammation of the protective membranes covering the brain and spinal cord, known collectively as the meninges. The most common symptoms are fever, headache, and neck stiffness. Other symptoms include confusion or altered consciousness, vomiting, and an inability to tolerate light or loud noises. Young children often exhibit only nonspecific symptoms, such as irritability, drowsiness, or poor feeding. If a rash is present, it may indicate a particular cause of meningitis; for instance, meningitis caused by meningococcal bacteria may be accompanied by a characteristic rash.

**Reference:**

- 1 - "Bacterial Meningitis". CDC. 1 April 2014. Archived from the original on 5 March 2016. Retrieved 5 March 2016.
- 2 - Sáez-Llorens X, McCracken GH (June 2003). "Bacterial meningitis in children". *Lancet*. 361 (9375): 2139–48. doi:10.1016/S0140-6736(03)13693-8. PMID 12826449.
- 3 - van de Beek D, de Gans J, Tunkel AR, Wijdicks EF (January 2006). "Community-acquired bacterial meningitis in adults". *The New England Journal of Medicine*. 354 (1): 44–53. doi:10.1056/NEJMra052116. PMID 16394301.