

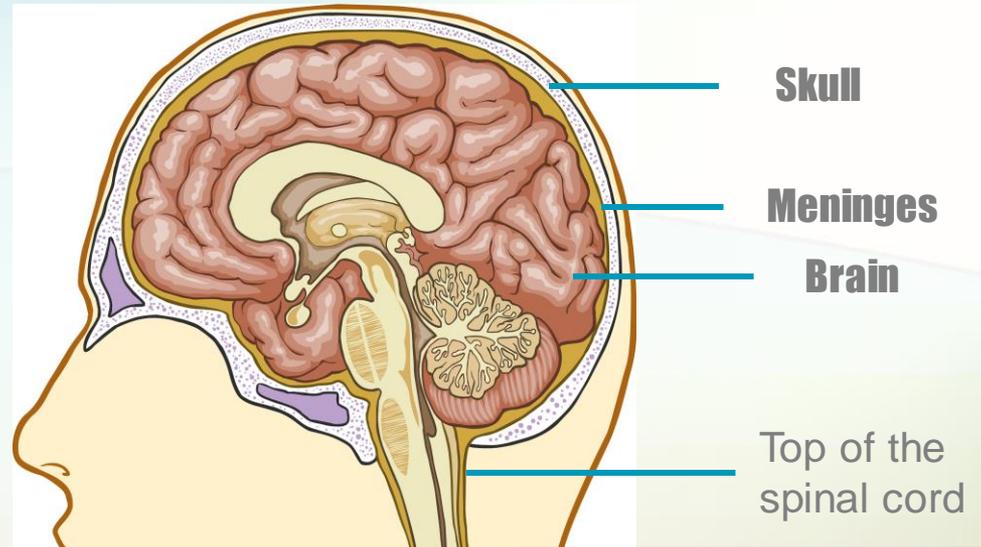


# **Viral and Bacterial Meningitis**

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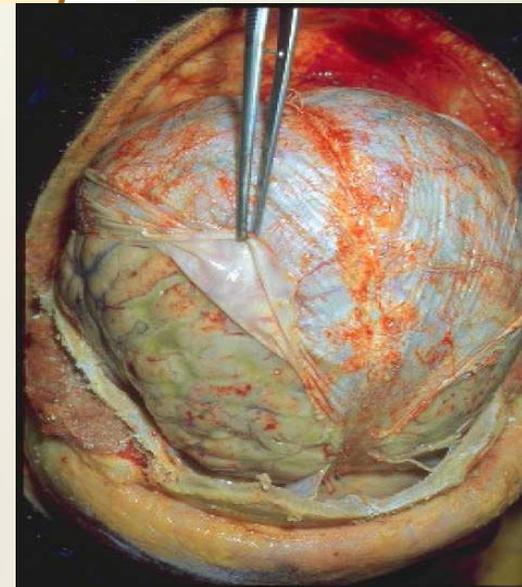
# What is meningitis?

Meningitis is an infection which causes inflammation of the membranes covering the brain and part of spinal cord.

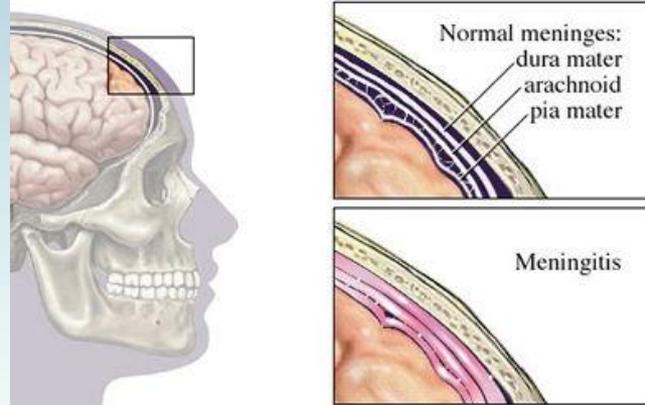


## What is septicaemia?

Some bacteria that cause meningitis can also cause septicaemia (blood poisoning). Septicaemia is a cause of sepsis - a life-threatening condition that arises when the body's response to an infection injures its own tissues and organs.



# Meningitis.....



- Non-bacterial meningitis is often referred to as ‘aseptic meningitis’ – eg. viral meningitis
- Bacterial meningitis may be referred to as ‘purulent meningitis’.

## Common causes and risks

The most common causes of meningitis are viral infections that usually resolve without treatment.

Bacterial infections of the meninges are extremely serious illnesses, and may result in death or brain damage even if treated.

# Symptoms of meningitis....

## Adults and children



Vomiting



High temperature/  
fever



Violent or  
severe  
headache



Neck  
stiffness



Dislike of  
bright  
lights



Drowsiness,  
lethargy



Joint  
pains



Fitting

THE SYMPTOMS MAY NOT ALL APPEAR AT THE SAME TIME



Fever  
which can be  
accompanied  
by the hands  
& feet  
feeling cold



Refusing  
feeds or  
vomiting



High  
pitched  
moaning cry  
or  
whimpering



Dislike of  
being  
handled,  
fretful



Neck  
retraction  
with  
arching of  
back



Blank &  
staring  
expression



Child is  
difficult to  
wake,  
lethargic



Pale  
blotchy  
complexion

## Babies

*Neonates and the elderly often present atypically .*

# What causes meningitis?

Meningitis is most commonly caused by bacteria or viruses

**Bacterial**

**Meningococcal** (most common cause)

Pneumococcal

TB

Group B streptococcal

E. coli

Hib

**Viral**

Enteroviruses

Herpes Simplex

Mumps (now rare)

# Definitions

- Doctors call meningitis caused by the bacteria *Neisseria meningitidis* meningococcal meningitis
- TB meningitis Tuberculous meningitis is caused by *Mycobacterium tuberculosis*.
- *S. agalactiae*, or group B streptococcus or GBS causes pneumonia and meningitis in newborns and the elderly
- Pneumococcal meningitis is caused by *Streptococcus pneumoniae* bacteria (also called pneumococcus, or *S. pneumoniae*).
- Hib meningitis *Haemophilus influenzae* type b (Hib) is a bacterium that infects the lining of the brain, causing meningitis.

# Viral and bacterial meningitis

## Viral meningitis

Rarely life-threatening

Pain relief, fluids and rest

Not considered to be contagious

After-effects include headaches, tiredness and memory loss

## Bacterial meningitis

Life-threatening

Rapid admission to hospital, treated with antibiotics

Can be contagious and may require public health action

After-effects include deafness, acquired brain injury and limb loss (septicaemia)

# **Meningococcal disease**

- **A term used to describe two major illnesses – meningitis and septicaemia (blood poisoning) caused by meningococcal bacteria**
- **Meningococcal disease is the most common cause of bacterial meningitis in the UK**
- **There are five main groups of meningococcal bacteria that commonly cause disease - MenA, MenB, MenC, MenW, MenY**

# **Recognising the signs and symptoms**

- **Meningitis and septicaemia often happen together. Be aware of all the signs and symptoms**
- **Symptoms can appear in any order. Some may not appear at all**
- **Someone with meningitis or septicaemia can get a lot worse very quickly. Keep checking them**

# Be aware

## Common signs + symptoms



Fever, cold hands and feet



Vomiting



Drowsy, difficult to wake



Confusion and irritability



Severe muscle pain



Pale, blotchy skin  
Spots/rash  
**See Glass Test**



Severe headache



Stiff neck



Dislike bright lights



Convulsions/  
seizures

- Early symptoms can include: fever, headache, vomiting, diarrhoea, muscle pain, stomach cramps and fever with cold hands and feet
- If someone is ill and getting worse, get medical help immediately

# Septicaemia and the 'glass test'

People with septicaemia may develop a rash of tiny red 'pin pricks' which can develop into purple bruising

**This rash does not fade under pressure; do the 'glass test'**

- Fever with spots/rash that do not fade under pressure is a **medical emergency**
- **Do not wait for a rash.** If someone is ill and getting worse, get medical help immediately
- **On dark skin** the spots/rash can be more difficult to see. Do not wait for the rash. Be aware of all the signs and symptoms



# How can meningitis be prevented?

- **Vaccines are the only way to prevent meningitis**
- **BUT vaccines are not available to prevent all types of meningitis**
- **Know the signs and symptoms to look out for, and the action to take**



# The impact of meningitis and septicaemia

- Following bacterial meningitis 10% will die
- It's estimated up to one person in every two or three who survives bacterial meningitis is left with one or more permanent problems
- After-effects are more common following bacterial meningitis or septicaemia

# After-effects following meningitis and septicaemia

## Physical

- **Hearing loss**
- **Sight problems**
- **Speech problems**
- **Limb loss, weakness or paralysis**
- **Skin scarring/damage**
- **Organ damage**

## Neurological and Emotional

- Epilepsy
- Learning and behavioural problems
- Headaches
- Memory and concentration issues
- Emotional difficulties

*Meningitis can devastate lives within hours and its impact can last a lifetime*

# Viral (aseptic) Meningitis

**Definition:** A syndrome characterized by acute onset of meningeal symptoms, fever, and cerebrospinal fluid pleocytosis, with bacteriologically sterile cultures.

## Laboratory criteria for diagnosis:

No evidence of bacterial or fungal meningitis

## Case classification

*Confirmed:* a clinically compatible illness diagnosed by a physician as aseptic meningitis, with no laboratory evidence of bacterial or fungal meningitis

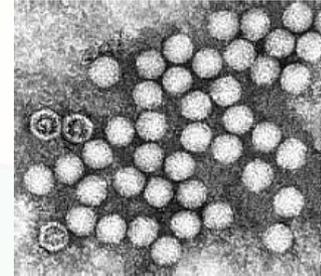
## Comment

Aseptic meningitis is a syndrome of multiple etiologies, but most cases are caused by a viral agent.

# Viral Meningitis

## ❖ Etiological Agents:

- Enteroviruses (Coxsackie's A,B and echovirus): most common.
- Adenovirus
- Measles virus
- Herpes Simplex Virus
- Varicella
- Arbovirus



## ❖ Modes of transmission:

- Primarily person to person and arthropod vectors for Arboviruses

## ❖ Incubation Period:

- Variable. For enteroviruses 3-6 days, for arboviruses 2-15 days

## ❖ Treatment: *No specific treatment available or symptomatic.* **Most patients recover completely on their own.**

# Transmission

- Fecal – oral route: poor hygiene, dirty diapers (especially in day-care settings)
- Ingestion via contaminated food and water
- Contact with infected hands
- Inhalation of infectious aerosols

# **Viral Meningitis**

- **90% caused by enteroviruses**
  - **Coxsackie virus (A and B groups)**
  - **Echo virus**
- **Other viruses**
  - **HSV2 (HSV1 causes encephalitis)**
  - **HIV**
  - **Lymphocytic choriomeningitis virus**
  - **Mumps**
  - **Varicella Zoster**

# Viral Meningitis

- Cannot distinguish initially from bacterial meningitis
- May be preceded by a few weeks by viral gastroenteritis
- Almost never involves brain in (**enteroviruses**) (meningoencephalitis)
  - Patient never obtunded, no History of seizure
- Disease is self-limited, resolves after 7 to 10 days without treatment
- No serious sequelae

# CSF

	Appearance	Opening Pressure mmHg	WBC (cell/μL)	Protein (mg/dl)	Glucose (mg/dL)
<b>Normal</b>	Clear	90-180	< 8	15-45	50-80
<b>Bacterial Meningitis</b>	Turbid	Elevated	>1000-2000	>200	<40
<b>Viral Meningitis</b>	Clear	Normal	<300; Lymphocytic predominance	<200	Normal
<b>Fungal Meningitis</b>	Clear	Normal- elevated	<500	>200	Normal - Low

# Laboratory Diagnosis

- **Virus Isolation**
  - Mainstay of diagnosis of enterovirus infection
  - Coxsackie B and Echoviruses can be readily grown in cell culture from throat swabs, faeces, and rectal swabs. They can also be isolated from the CSF
  - Coxsackie A viruses cannot be easily isolated in cell culture. They can be isolated readily in suckling mice but this is not offered by most diagnostic laboratories because of practical considerations. Molecular techniques may provide a better alternative.
- **Serology**
  - Neutralization tests or EIAs are used but are very cumbersome and thus not offered by most diagnostic laboratories
- **Molecular**
  - PCR

# Approach

- **Treat like bacterial meningitis until the 72 hrs culture comes back negative**

**But**

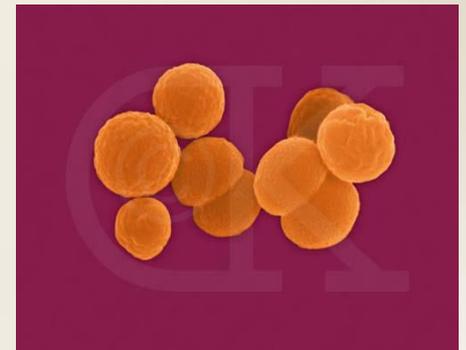
- **HSV meningitis:**
- **Behavioral and personality changes**
- **Ct scan Temporal lobe**
- **Aciclovir iv**

# **Viral meningitis - Treatment**

- Supportive
- No antibiotics
- Analgesia
- Fever control
- Often feel better after LP
- No isolation - Standard precautions

# Viral meningitis - Outcomes

- Adverse outcomes rare
- Infants <1 year have higher incidence of speech & language delay
- Neurological complications are rare
- Encephalitis may develop, though this is rare. **(HSV1, Measles, Flaviviruses)**



# **MENINGITIS CAN AFFECT ANYONE**



**It can strike quickly and kill  
within hours**



**saving lives,  
rebuilding futures**

**[www.MeningitisNow.org](http://www.MeningitisNow.org)**

Registered Charity No. 803016 (England & Wales) SC037790 (Scotland)

Referencing, Some of the above slides  
reference