CONDITION

Meningitis

Meningitis is inflammation around the brain and spinal cord, usually caused by an infection.

WHAT IT IS
Inflammation around the brain and spinal cord

BODY SYSTEM
Brain and nervous system

MAIN SYMPTOMS
Fever, severe headache, stiff neck, confusion

WHAT CAUSES IT
Usually viral or bacterial infection

HOW IT IS DIAGNOSED
Spinal fluid tests, blood tests, and cultures

MAIN TREATMENT
Urgent antimicrobial treatment and supportive hospital care

CAN IT BE CURED?
Sometimes - many infections respond to treatment

IS IT AN EMERGENCY?
Yes - suspected meningitis needs immediate assessment

LONG-TERM OUTLOOK
Many recover; bacterial cases can cause lasting disability

Overview

Meningitis is inflammation of the meninges, the thin protective layers around the brain and spinal cord. It is most often caused by an infection.

Several types of infection can cause meningitis. Viral meningitis is more common and is often less severe. Bacterial meningitis is less common but can become life-threatening quickly. Fungi, parasites and tuberculosis can also cause meningitis. Rarely, inflammation develops without an infection.

Symptoms can resemble flu or other common illnesses at first. They may then worsen over hours or days. A rash is possible with meningococcal infection, but many people with meningitis do not have one.

Meningitis is not the same as sepsis, which is a dangerous reaction to infection affecting the

whole body. However, meningococcal bacteria can cause meningitis, sepsis or both. Suspected meningitis needs immediate medical assessment because its cause cannot be identified safely from symptoms alone.

Symptoms

Symptoms depend on the cause, age and stage of the condition. They do not always appear together or in a set order.

Common symptoms in older children and adults include:

A red, purple or bruise-like rash that does not fade when pressed can occur with meningococcal infection. The rash may be harder to see on brown or black skin. Check paler areas such as the palms, soles, inside the eyelids and roof of the mouth. Do not wait for a rash before seeking help.

Babies may not develop a clear headache or stiff neck. Signs can include poor feeding, vomiting, unusual sleepiness, irritability, a weak or high-pitched cry, a stiff or floppy body, seizures, or a bulging soft spot on the head. A baby may have a low temperature instead of a fever.

- Fever
- Severe or unusual headache
- Stiff or painful neck
- Dislike of bright light
- Nausea or vomiting
- Sleepiness, confusion or difficulty waking
- Seizures
- Rapid breathing
- Cold hands and feet
- Muscle or joint pain

Causes and risk factors

Viruses are a frequent cause. Enteroviruses are common examples. Herpes viruses, including herpes simplex and chickenpox viruses, can also affect the meninges. Many viral cases

improve without specific treatment, although some viruses require urgent antiviral treatment.

Bacterial causes include meningococcal, pneumococcal and Haemophilus influenzae type b bacteria. Group B streptococcus and E. coli are important causes in newborns. Other bacteria become more relevant with older age, pregnancy, reduced immunity or certain health conditions.

Tuberculosis can cause meningitis that develops more gradually. Fungal meningitis is uncommon and mainly affects people with weakened immune systems. Parasitic meningitis is rare and may be linked to particular environmental or travel exposures.

Non-infectious meningitis can result from autoimmune inflammation, cancer affecting the meninges, or reactions to certain medicines. It is not contagious.

Risk is higher in newborns, teenagers and young adults, older adults, and people with reduced immunity. Living in close-contact settings, such as student housing or military accommodation, can increase exposure to meningococcal bacteria. A missing or poorly functioning spleen, a leak of fluid from around the brain, and some ear or skull conditions also increase risk.

Diagnosis

Diagnosis begins with an urgent assessment of symptoms, vital signs and alertness. A clinician will look for signs of meningitis and sepsis, but no single physical sign can confirm or exclude the condition.

A lumbar puncture, sometimes called a spinal tap, is the main test. A needle is placed in the lower back to collect cerebrospinal fluid, the clear fluid surrounding the brain and spinal cord. The sample can show inflammation and may identify bacteria, viruses or fungi using culture, microscopy and molecular tests such as PCR.

Blood tests and blood cultures can identify infection and assess how the body is responding. Swabs or other samples may sometimes help find the cause.

A CT or MRI scan does not usually confirm meningitis. Brain imaging may be needed before a lumbar puncture if there are signs of raised pressure around the brain, a specific neurological problem or another reason the procedure may be unsafe. When bacterial meningitis is suspected, treatment should not be delayed simply to wait for imaging or a lumbar puncture.

Treatment and management

Treatment usually begins in hospital. The approach depends on the likely cause, but doctors

may need to start treatment before test results are available.

Suspected bacterial meningitis is treated immediately with antibiotics like amoxicillin or doxycycline given into a vein. A corticosteroid like prednisone or hydrocortisone may also be used to reduce damaging inflammation in selected cases. Treatment can be adjusted when laboratory results identify the organism.

Viral meningitis often needs fluids, pain relief, treatment for nausea and monitoring. Antiviral medicine is used when certain herpes viruses are suspected or confirmed. Severe cases may need intensive care.

Tuberculous and fungal meningitis require specialist antimicrobial treatment, usually for much longer than routine bacterial meningitis. Non-infectious meningitis is managed by treating its underlying cause.

Hospital care may also include oxygen, intravenous fluids, seizure treatment and support for blood pressure or breathing. Infection-control precautions may be used until the cause is clearer.

When meningococcal disease or certain other bacterial infections are confirmed, public health teams identify close contacts who may need preventive antibiotics or vaccination. Casual contacts usually do not need treatment.

Complications

Bacterial meningitis can cause complications even when treatment begins promptly. Possible effects include hearing loss, seizures, problems with memory or concentration, weakness, balance difficulties, vision problems, stroke and fluid buildup around the brain.

Meningococcal sepsis can damage the skin, limbs and organs. Severe cases can be fatal.

Complications are generally less common after viral meningitis, but tiredness, headache, sleep problems and difficulty concentrating can continue during recovery. Hearing checks and neurological or developmental follow-up may be recommended after bacterial meningitis, especially for children.

Prevention

Not every case of meningitis can be prevented.

Vaccines reduce the risk from several important causes, including meningococcal, pneumococcal and Haemophilus influenzae type b bacteria. Vaccines do not cover every strain

or every cause, so a vaccinated person can still develop meningitis. Recommended vaccines depend on age, health conditions, travel and local vaccination programmes.

Everyday steps that reduce the spread of respiratory and digestive infections may also help. Wash your hands, avoid sharing drinks or utensils, cover coughs and stay away from others when you are unwell.

After meningococcal disease, close contacts may be offered preventive antibiotics because the bacteria can spread through prolonged close contact with saliva or respiratory droplets. These medicines should be arranged through medical or public health services. They are not routinely needed by everyone who has been in the same room.

Reducing immune-suppressing treatment or changing medicines is not a safe prevention strategy without medical advice.

Living with it and what to expect

The course depends strongly on the cause and how severely the brain, nerves or circulation were affected.

Many people with uncomplicated viral meningitis improve over days to a few weeks. Headaches, tiredness and reduced concentration can last longer, so a gradual return to school, work and exercise may be needed.

Recovery from bacterial, tuberculous or fungal meningitis may take months. Some people recover fully, while others need rehabilitation, hearing support, seizure care or help with movement, learning and emotional health. Children may need developmental follow-up because some effects become clearer as they grow.

After discharge, routine follow-up may include a hearing test and review of ongoing headaches, balance, memory, mood or seizures. New or worsening symptoms should not simply be assumed to be part of recovery.

Meningitis can recur, but this is unusual. Repeated episodes may lead to testing for an immune problem, an anatomical pathway for infection, or a less common inflammatory cause.

When to get medical help

Seek emergency medical help now if you or someone else has possible meningitis symptoms, especially:

Do not wait for every symptom to appear. Do not wait for a rash, and do not rely on a glass test

to rule meningitis out. If symptoms improve briefly but then worsen, seek urgent reassessment.

Arrange routine follow-up after meningitis for persistent tiredness, headaches, hearing changes, poor balance, sleep problems, mood changes or difficulty concentrating. Get earlier medical advice if these symptoms are worsening or interfering substantially with daily life.

- Fever with a severe headache, stiff neck or confusion
- Difficulty waking, unusual drowsiness or rapidly worsening illness
- A seizure
- A red or purple rash that does not fade under pressure
- Breathing difficulty, pale or mottled skin, or very cold hands and feet
- Concerning symptoms in a baby, including poor feeding, a high-pitched cry, unusual floppiness or a bulging soft spot

Common questions

Is meningitis contagious?

Meningitis itself describes inflammation and is not something you "catch." Some infections that cause it can spread between people. Meningococcal bacteria usually require close or prolonged contact with saliva or respiratory droplets. Enteroviruses can spread through respiratory secretions or contact with stool. Non-infectious meningitis is not contagious.

Can you have meningitis without a rash?

Yes. Most causes do not produce a rash, and a meningococcal rash may appear late or not at all. Fever, severe headache, neck stiffness, confusion, unusual sleepiness or rapid deterioration still require emergency assessment.

Can I get meningitis if I have been vaccinated?

Yes, although vaccination lowers the risk from the organisms it covers. No vaccine protects against every type of meningococcal or pneumococcal bacteria, and vaccines do not prevent most viral or non-infectious causes. Seek urgent help for possible symptoms regardless of vaccination history.

How quickly does meningitis develop?

Bacterial meningitis can worsen within hours. Viral meningitis may develop over hours or several days. Tuberculous, fungal and some non-infectious forms can develop more gradually. The speed of symptoms cannot reliably identify the cause.

Does meningitis always cause a stiff neck?

No. Neck stiffness may be absent early in the illness and is less obvious in babies, older adults and people with reduced immunity. Its absence does not rule meningitis out.

Can meningitis come back?

It can, but repeated episodes are uncommon. Recurrence may be linked to a persistent infection, reduced immunity, a leak of fluid around the brain or spinal cord, or an inflammatory condition. Repeated symptoms need medical investigation.

Sources

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