CONDITION

Staphylococcal meningitis

Staphylococcal meningitis is a serious infection of the protective membranes around the brain and spinal cord.

WHAT IT IS
Bacterial infection around the brain and spinal cord

BODY SYSTEM
Brain, spinal cord, and nervous system

MAIN SYMPTOMS
Fever, severe headache, neck stiffness, confusion

WHAT CAUSES IT
Infection with Staphylococcus bacteria

HOW IT IS DIAGNOSED
Cerebrospinal fluid culture and blood cultures

MAIN TREATMENT
Hospital-based intravenous antibiotics and source control

CAN IT BE CURED?
Yes - prompt treatment can clear the infection

IS IT AN EMERGENCY?
Yes - suspected meningitis needs immediate hospital care

LONG-TERM OUTLOOK
Recovery possible, but lasting neurological problems or death can occur

Overview

Staphylococcal meningitis is an uncommon but serious form of bacterial meningitis. It happens when Staphylococcus bacteria infect the meninges, the thin protective layers around the brain and spinal cord.

The most common cause is Staphylococcus aureus . This includes methicillin-sensitive S. aureus and methicillin-resistant S. aureus , known as MSSA and MRSA. Other staphylococci, especially coagulase-negative staphylococci, can cause meningitis linked to brain surgery, drains, or implanted devices.

The infection may reach the meninges through the bloodstream from another part of the body. It can also develop after neurosurgery, a head injury, or infection of a device that drains fluid from the brain.

Staphylococcal meningitis needs treatment in hospital. Early antibiotics and control of the original source of infection give the best chance of recovery.

Symptoms

Symptoms can develop quickly, sometimes over hours or a few days. They may be harder to recognise in babies, older adults, and people with weakened immune systems.

Common symptoms include:

Not everyone has every symptom. Fever or neck stiffness may be absent, particularly in older adults or people who are already very unwell.

Babies may be irritable, unusually sleepy, difficult to feed, or less responsive than normal. Other possible signs include vomiting, a high-pitched cry, a swollen soft spot on the head, or a body that feels unusually stiff or floppy.

People who develop meningitis after brain surgery or while they have a drain or shunt may have less typical symptoms. A new fever, worsening alertness, redness or discharge along the device, or a change in how the device works may be important.

A skin rash is not a defining feature of staphylococcal meningitis. Do not wait for a rash before seeking emergency help.

- Fever or chills
- Severe or worsening headache
- A stiff or painful neck
- Confusion, unusual sleepiness, or difficulty waking
- Nausea or vomiting
- Discomfort in bright light
- Seizures
- New weakness, speech problems, or loss of coordination

Causes and risk factors

Staphylococcus bacteria commonly live on the skin or in the nose without causing illness. Meningitis develops only when the bacteria enter parts of the body where they do not normally belong.

The bacteria may spread through the blood from an infection such as:

Staphylococcal meningitis can also follow neurosurgery, penetrating head trauma, or a leak of cerebrospinal fluid. Cerebrospinal fluid, often shortened to CSF, is the clear liquid surrounding the brain and spinal cord.

Implanted or temporary devices can provide another route for infection. These include brain shunts, external ventricular drains, and medication pumps connected to the nervous system.

Factors that may increase risk include a weakened immune system, injected drug use, recent hospital care, and the presence of an implanted nervous-system device. However, having a risk factor does not mean that meningitis will develop.

- A bloodstream infection
- Endocarditis, an infection involving a heart valve
- A spinal infection
- A deep skin, soft-tissue, bone, or joint infection
- An abscess, which is a pocket of infected fluid

Diagnosis

Diagnosis usually begins with a neurological examination and urgent blood tests. Blood cultures are taken to check whether bacteria are growing in the bloodstream.

The main test is a lumbar puncture, sometimes called a spinal tap. A clinician places a needle into the lower back and removes a small sample of CSF. The laboratory checks the sample for signs of inflammation and tries to identify the bacterium through culture or other microbiological tests.

A positive culture helps determine which antibiotics like amoxicillin or doxycycline are likely to work. However, antibiotics given before the lumbar puncture may make cultures less likely to grow bacteria. Other findings in the CSF can still support the diagnosis.

A brain scan may be needed before a lumbar puncture if there are concerns about pressure inside the skull, a new neurological problem, a recent seizure, or another reason the procedure may not be safe immediately. Treatment should not be unnecessarily delayed while tests are arranged.

MRI or CT scans can also look for complications or a source of infection, such as an abscess, spinal infection, infected shunt, or stroke. An ultrasound scan of the heart may be used if endocarditis is suspected.

Coagulase-negative staphylococci can sometimes enter a sample from the skin during collection. Clinicians interpret these results alongside symptoms, CSF findings, repeat cultures, and whether a device is present.

Treatment and management

Treatment takes place in hospital, usually with antibiotics given into a vein. Because laboratory identification takes time, initial treatment often covers several possible bacteria. Antibiotics are then adjusted when culture and susceptibility results show the exact organism and which medicines can kill it.

MSSA and MRSA respond to different antibiotics. The treatment team also considers allergies, kidney function, whether an implanted device is present, and whether the infection began in the community or after healthcare.

Treatment commonly continues for an extended period, but there is no single length that fits everyone. The duration is influenced by repeat culture results, response to treatment, the source of infection, and complications such as endocarditis, an abscess, or a spinal infection.

Source control means removing or treating the place where the bacteria are continuing to grow. This may involve:

Supportive care may include fluids, oxygen, medicine for pain or fever, seizure treatment, and monitoring of brain pressure and organ function. Some people need intensive care.

Rehabilitation may begin in hospital if the infection affects movement, speech, swallowing, hearing, memory, or everyday skills.

- Removing or replacing an infected shunt or drain
- Draining an abscess
- Treating an infected heart valve, bone, joint, or spinal area
- Caring for an infected surgical wound

Complications

Inflammation around the brain can interfere with blood flow, fluid drainage, and normal brain function. Complications can happen during the infection or become clear during recovery.

Possible complications include:

Complications are more likely when treatment is delayed, the bacteria are also present in the

bloodstream, or an infected device or another source cannot be controlled quickly. Even so, an individual outcome cannot be predicted from one factor alone.

- Sepsis, a harmful whole-body response to infection
- Seizures
- Stroke or damage to brain tissue
- Brain or spinal abscesses
- Ventriculitis, infection inside the brain's fluid-filled spaces
- Hydrocephalus, a build-up of fluid in or around the brain
- Hearing loss
- Problems with balance, movement, speech, memory, or concentration
- Death

Prevention

Staphylococcal meningitis cannot always be prevented. Staphylococcus bacteria are common, and some cases begin from infections that were not obvious beforehand. There is no routinely available vaccine against staphylococcal meningitis.

Hospitals reduce device-related infections through sterile procedures, careful wound care, and removing drains or lines when they are no longer needed.

If you have a shunt, drain, or recent neurosurgical wound, follow the care instructions you were given. Report redness, swelling, leaking fluid, worsening pain, fever, or a change in how the device works.

Good hand hygiene and proper covering of draining wounds can reduce the spread of staphylococci. Avoid sharing items that touch broken skin, such as razors or towels.

Some people carry MRSA without being ill. Treatments to reduce carriage are used only in selected circumstances, such as before certain procedures or during infection-control programmes. They do not guarantee that meningitis will be prevented.

Living with it and what to expect

The first phase of staphylococcal meningitis is usually spent in hospital. Progress is followed through symptoms, examinations, blood tests, cultures, and imaging when needed. People

with an infected device or infection elsewhere in the body may need surgery or a longer hospital stay.

Recovery after discharge can take weeks or months. Tiredness, headaches, reduced stamina, poor sleep, and difficulty concentrating can continue even when the infection has cleared. These symptoms may improve gradually, but recovery is not identical for everyone.

Some people return to their previous health. Others have lasting problems with hearing, movement, seizures, memory, mood, or work and school activities. Rehabilitation, hearing services, physiotherapy, speech and language therapy, or occupational therapy may help with specific effects.

Routine follow-up may include checking recovery, hearing, medication effects, neurological symptoms, and the original source of infection. If a shunt or another device remains necessary, ongoing device care may also be arranged.

Recurrence is possible, especially if an infected device or another source remains. A new fever, severe headache, confusion, or neurological symptom after treatment should be assessed urgently rather than left until a routine appointment.

When to get medical help

Call emergency services now if you or someone else has possible meningitis symptoms, especially:

Do not wait for all the typical symptoms to appear. Do not wait for a rash.

After hospital treatment, attend planned follow-up appointments. Contact the follow-up team promptly for a returning fever, worsening headache, persistent vomiting, wound redness or discharge, problems with a shunt, new hearing changes, or recovery that is moving backwards.

Milder ongoing fatigue or concentration problems can usually be discussed at routine follow-up unless they suddenly worsen or occur with emergency symptoms.

- Severe headache with fever or neck stiffness
- Confusion, unusual drowsiness, or difficulty waking
- A seizure
- New weakness, facial drooping, speech difficulty, or loss of coordination
- Rapid deterioration or severe illness
- Concerning symptoms after neurosurgery or with a brain shunt or drain

Common questions

Is staphylococcal meningitis contagious?

It does not usually spread between people in the same way as meningococcal meningitis. Staphylococci can spread through direct contact, particularly from infected wounds, but meningitis usually develops when bacteria enter the bloodstream or nervous system.

Close contacts are not normally given preventive antibiotics solely because someone has staphylococcal meningitis. Hospital infection-control teams may give separate advice if MRSA or a healthcare-related outbreak is involved.

Is staphylococcal meningitis the same as MRSA meningitis?

Not always. MRSA is one type of Staphylococcus aureus that resists several commonly used antibiotics. Staphylococcal meningitis can also be caused by MSSA or by other staphylococcal species.

Laboratory testing identifies the type and shows which antibiotics are likely to work.

Can staphylococcal meningitis be cured?

Yes, the infection can be cleared with effective antibiotics and treatment of its source. However, it remains a serious condition. Some people develop lasting complications even after the bacteria have been removed.

How long does treatment take?

Treatment usually requires an extended course of intravenous antibiotics. The exact length is based on the bacterium, repeat cultures, clinical recovery, infected devices, and infection elsewhere in the body. Complications such as endocarditis or an abscess can require longer treatment.

Can staphylococcal meningitis come back?

It can return if bacteria remain in an infected device or another part of the body. Removing or treating the source reduces this risk. New meningitis symptoms after treatment require emergency assessment.

How does staphylococcal meningitis reach the brain?

The bacteria may travel through the bloodstream from another infection. They can also enter after neurosurgery, a serious head injury, or infection involving a shunt, drain, or other device connected to the nervous system.

Sources

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