CONDITION

Meningococcal meningitis

Learn how meningococcal meningitis spreads, which symptoms need emergency care, how it is diagnosed and treated, and what follow-up may involve.

WHAT IT IS
Serious bacterial infection inflaming the meninges

BODY SYSTEM
Nervous system

MAIN SYMPTOMS
Fever, severe headache, stiff neck, non-fading rash

WHAT CAUSES IT
Meningococcal bacterial infection

HOW IT IS DIAGNOSED
Blood culture, PCR, cerebrospinal fluid testing

MAIN TREATMENT
Intravenous antibiotics and supportive care

CAN IT BE CURED?
Yes, antibiotics can clear the infection

IS IT AN EMERGENCY?
Yes, suspected disease requires emergency hospital treatment

LONG-TERM OUTLOOK
Many recover, but lasting complications can occur

Overview

Bacterial meningococcal meningitis is a serious infection caused by the bacterium Neisseria meningitidis , also called meningococcus. The infection inflames the meninges, the thin layers of tissue surrounding the brain and spinal cord.

Meningococcus can also enter the bloodstream. This is called meningococcal bloodstream infection or meningococcal sepsis. Meningitis and bloodstream infection can occur separately or at the same time.

Meningococcal disease can worsen quickly and requires emergency hospital treatment. Early antibiotics like amoxicillin or doxycycline improve the chance of recovery and may reduce complications. Treatment should not be delayed while waiting for all test results.

The bacteria spread through respiratory or throat secretions, such as saliva. Transmission usually requires close or prolonged contact. Many people can carry meningococcus in the back of the nose or throat without becoming ill. Only a small proportion develop invasive disease.

Vaccines can protect against several major groups of meningococcal bacteria. However, no vaccine prevents every case. A vaccinated person with possible symptoms still needs immediate medical assessment.

Symptoms

Symptoms may appear suddenly and can become more severe over several hours. Not everyone develops every symptom, and the early signs can resemble influenza or another common infection.

Symptoms of meningococcal meningitis may include:

A non-fading rash is caused by bleeding under the skin and may look like tiny pinpoints or larger purple patches. It is an important warning sign, but it may be absent, especially early in the illness. Do not wait for a rash before seeking help.

Bloodstream infection may cause rapid breathing, cold hands or feet, severe muscle or limb pain, pale or mottled skin, reduced urination, confusion, or collapse. These can be signs that the body is not getting enough blood and oxygen.

Babies may not develop the typical combination of headache and neck stiffness. Possible signs include poor feeding, vomiting, irritability, unusual sleepiness, a weak or high-pitched cry, a stiff or floppy body, seizures, or a bulging soft spot on the head. Fever may be present, but some young infants have a normal or low temperature.

Seek emergency medical care immediately for possible meningococcal disease. Concerning combinations include fever with severe headache, neck stiffness, confusion, unusual difficulty waking, a seizure, rapid worsening, or a non-fading red or purple rash. Call emergency services rather than driving if the person is severely unwell, difficult to wake, having a seizure, or having trouble breathing.

- Fever
- Severe or worsening headache
- Stiff or painful neck
- Nausea or vomiting
- Discomfort from bright light

- Unusual sleepiness, difficulty waking, or confusion
- Seizures
- A red, purple, or bruise-like rash that does not fade when pressed

Causes and risk factors

Meningococcal meningitis occurs when N. meningitidis moves beyond the nose or throat and reaches the blood or the tissues around the brain and spinal cord. It is not always clear why a person who carries the bacteria develops invasive disease while another person does not.

The bacteria spread through close exposure to respiratory or throat secretions. Examples include living in the same household, kissing, or having direct contact with saliva. Spread may also occur during unprotected contact with a person's airway secretions. Brief, casual contact usually carries much less risk.

People at increased risk include:

Smoking and exposure to tobacco smoke can damage the lining of the nose and throat and may increase susceptibility. Recent respiratory infections may also make it easier for meningococcus to invade the body.

There are several groups, or serogroups, of meningococcal bacteria. Vaccines are available against important disease-causing groups, including vaccines commonly described as MenACWY and MenB. Which vaccines are advised depends on age, medical risk, travel, outbreak conditions, and national or regional recommendations.

- Infants, adolescents, and young adults
- People living in crowded or shared settings
- People without a functioning spleen
- People with certain disorders of the complement system, which is part of the immune system
- People taking medicines that block complement proteins
- Laboratory workers who may be exposed to meningococcal bacteria
- Travelers to places where meningococcal disease is common or where an outbreak is occurring
- People exposed during a local outbreak

Diagnosis

Possible meningococcal meningitis is assessed as a medical emergency. Clinicians first check breathing, circulation, blood pressure, level of alertness, and signs of shock or raised pressure around the brain.

Blood samples are usually collected to look for the bacteria and to assess how the infection is affecting the body. Tests may include a blood culture, which attempts to grow the organism, and polymerase chain reaction, or PCR, which detects bacterial genetic material.

A lumbar puncture may be performed. During this procedure, a needle is placed in the lower back to collect cerebrospinal fluid, the fluid surrounding the brain and spinal cord. The sample can be tested for inflammation and for evidence of meningococcus or another cause.

A lumbar puncture may need to be postponed if the person is unstable or has signs that the procedure could be unsafe. Brain imaging is not required before every lumbar puncture, but it may be needed when certain neurological findings suggest increased risk. Antibiotics should not be delayed for imaging or lumbar puncture when bacterial meningitis is strongly suspected.

Tests are also used to distinguish meningococcal meningitis from other bacterial or viral infections. Identifying the organism helps clinicians select the most focused antibiotic and allows public health teams to assess whether close contacts need preventive treatment.

Treatment and management

Treatment begins in the hospital with antibiotics given through a vein. Because the exact cause is often unknown at first, initial antibiotics usually cover several bacteria that can cause meningitis. Once tests identify meningococcus and show which antibiotics are effective, the treatment may be adjusted.

Ceftriaxone or cefotaxime is commonly used for suspected or confirmed meningococcal disease. Other antibiotics may be appropriate depending on test results, allergies, local resistance patterns, and the person's clinical condition. Treatment choices and duration are determined by the hospital team.

A corticosteroid such as dexamethasone may be given early when bacterial meningitis is suspected, often before or with the first antibiotic dose. Its use after a specific organism is identified depends on the clinical situation and local guidance.

Supportive care is also important. This may include intravenous fluids, oxygen, medicines to support blood pressure, seizure treatment, and careful management of pressure or swelling around the brain. People with severe sepsis may need treatment in an intensive care unit.

Hospitals use infection-control precautions to reduce spread. A person is generally no longer considered contagious after receiving effective antibiotics for an appropriate period, commonly 24 hours, but the treating and public health teams determine when precautions can stop.

Close contacts may be offered preventive antibiotics, called chemoprophylaxis. These medicines remove meningococcus from the throat and lower the chance of further cases. Public health professionals decide who qualifies based on the type and timing of contact.

Household members, intimate partners, certain childcare contacts, and people directly exposed to oral or airway secretions may qualify. Casual classmates, coworkers, or healthcare workers without direct exposure generally do not. Preventive antibiotics should be arranged promptly and are recommended based on exposure even if the contact has previously been vaccinated.

Vaccination may also be recommended for some contacts when the strain is covered by an available vaccine or when the case is part of an outbreak. Vaccination does not replace preventive antibiotics after a qualifying recent exposure.

Complications

Many people recover, especially when treatment begins early, but meningococcal meningitis can cause lasting health problems. The infection and the body's inflammatory response can injure the brain, nerves, blood vessels, or other organs.

Possible complications include:

A severe bloodstream infection can cause septic shock, meaning blood pressure and circulation fall to dangerously low levels. It may also cause disseminated intravascular coagulation, a disorder in which abnormal clotting and bleeding occur throughout the body.

Emotional effects are also possible. A serious illness or intensive care stay may lead to anxiety, low mood, sleep problems, or distressing memories. Families and caregivers may need support as well.

- Hearing loss or ringing in the ears
- Problems with balance, vision, memory, concentration, or learning
- Seizures or epilepsy
- Weakness, coordination problems, or other neurological disabilities
- Fluid buildup around the brain

- Kidney, heart, or other organ injury after severe sepsis
- Scarring, tissue damage, or loss of a limb after impaired blood flow

Follow up

Follow-up after hospital discharge checks for complications that may not be obvious during the acute illness. The care plan depends on the person's age, illness severity, and recovery.

A hearing assessment is usually arranged because meningitis can damage hearing even when no problem is noticed at first. Children may need developmental, learning, or behavioral review. Adults may need assessment of memory, concentration, balance, work capacity, or daily functioning.

Recovery can take time. Fatigue, headaches, reduced stamina, sleep changes, and difficulty concentrating may continue after the infection has cleared. These symptoms should generally improve, but they are appropriate to discuss during routine follow-up, especially if they affect school, work, mobility, or self-care.

Follow-up may also include reviewing meningococcal vaccination status and checking for an underlying risk factor. Further immune-system testing may be considered after repeated meningococcal infections or when the clinical history suggests a complement disorder or spleen problem.

Keep routine appointments for hearing tests, rehabilitation, vaccination review, and neurological or developmental assessment. Contact the care team sooner for persistent fever, worsening headaches, new hearing or vision changes, increasing weakness, repeated vomiting, or a decline in normal activities.

Seek emergency care for a new seizure, confusion, difficulty waking, breathing trouble, collapse, a rapidly spreading non-fading rash, or a sudden return of severe meningitis symptoms.

Sources

- Centers for Disease Control and Prevention. "About Meningococcal Disease." National Center for Immunization and Respiratory Diseases, May 15, 2024.
- Centers for Disease Control and Prevention. "Clinical Guidance for Meningococcal Disease." National Center for Immunization and Respiratory Diseases.



- Centers for Disease Control and Prevention. "Chapter 8: Meningococcal Disease." Manual for the Surveillance of Vaccine-Preventable Diseases .
- National Institute for Health and Care Excellence. Meningitis (Bacterial) and Meningococcal Disease: Recognition, Diagnosis and Management . NICE Guideline NG240, published March 19, 2024.
- World Health Organization. "Meningitis." Fact sheet, April 17, 2023.
- McGill F, Heyderman RS, Panagiotou S, Tunkel AR, Solomon T. "Acute Bacterial Meningitis in Adults." The Lancet . 2016;388(10063):3036-3047.