CONDITION

West nile encephalitis

West Nile encephalitis is brain inflammation caused by West Nile virus, usually after a mosquito bite.

WHAT IT IS
Viral brain inflammation after West Nile infection

BODY SYSTEM
Brain and nervous system

MAIN SYMPTOMS
Fever, severe headache, confusion, muscle weakness

WHAT CAUSES IT
West Nile virus infection, usually from a mosquito bite

HOW IT IS DIAGNOSED
Blood or spinal-fluid antibodies, sometimes confirmed by neutralization testing

MAIN TREATMENT
Hospital supportive care and rehabilitation

CAN IT BE CURED?
Sometimes - infection clears; effects may remain

IS IT AN EMERGENCY?
Yes - suspected brain inflammation needs urgent hospital care

LONG-TERM OUTLOOK
Recovery may take months; some neurological problems persist

Overview

West Nile encephalitis is inflammation of the brain caused by West Nile virus. The virus usually reaches people through the bite of an infected mosquito.

Most West Nile infections do not cause encephalitis. Some people have no symptoms, while others develop a flu-like illness called West Nile fever. Encephalitis happens when the infection affects the central nervous system, which includes the brain and spinal cord.

Brain inflammation can interfere with awareness, memory, movement, swallowing, and breathing. For this reason, suspected encephalitis requires urgent assessment in a hospital.

West Nile virus can also cause meningitis, which is inflammation of the lining around the brain and spinal cord. Some people develop acute flaccid myelitis, a polio-like condition that

damages nerve cells controlling the muscles. These problems are collectively called neuroinvasive West Nile infection.

Symptoms

Symptoms usually begin several days after an infected mosquito bite. The interval can be longer in people with a weakened immune system. Because mosquito bites may go unnoticed, many people do not remember being bitten.

Possible symptoms of West Nile encephalitis include:

Meningitis is more likely to cause headache, neck stiffness, fever, and sensitivity to light without major changes in awareness.

Acute flaccid myelitis can cause sudden weakness, often affecting one arm or leg more than the other. Reflexes may be reduced or absent. Sensation can remain normal even when weakness is severe. If the breathing muscles are affected, breathing support may be needed.

Symptoms can overlap with stroke, bacterial meningitis, herpes encephalitis, medication effects, and other urgent conditions. Symptoms alone cannot confirm West Nile encephalitis.

- Fever and severe headache
- Confusion, unusual sleepiness, or difficulty staying alert
- Shaking, tremor, stiffness, or poor coordination
- Muscle weakness or paralysis
- Seizures
- Nausea or vomiting
- Sensitivity to light
- Changes in behaviour, memory, or speech

Causes and risk factors

West Nile virus belongs to a group of viruses called flaviviruses. Mosquitoes become infected after feeding on infected birds. They can then pass the virus to people and other animals through later bites.

People are considered incidental hosts. This means the amount of virus in human blood is usually too low to infect another mosquito. West Nile virus does not spread through coughing,

touching, sharing food, or ordinary household contact.

Rare transmission through donated blood, transplanted organs, pregnancy, birth, or breastfeeding has been reported. Blood donations are screened in places where West Nile virus is a recognised risk.

Anyone exposed to infected mosquitoes can become infected. The chance that an infection will affect the nervous system is higher in older adults and people with weakened immune systems. This includes some people receiving immune-suppressing medicines or living with certain cancers or transplant-related conditions.

Exposure is more likely when infected mosquitoes are active. Local risk changes with the season, weather, mosquito populations, and the presence of West Nile virus in birds.

Diagnosis

Diagnosis begins with your symptoms, examination, recent travel, possible mosquito exposure, and local West Nile activity. The care team will also look for other causes of brain inflammation because several require different treatment.

A lumbar puncture, also called a spinal tap, is often needed. A needle is used to collect a small sample of cerebrospinal fluid, the liquid surrounding the brain and spinal cord. The sample can show inflammation and can be tested for antibodies made against West Nile virus.

The main diagnostic test looks for West Nile-specific IgM antibodies in blood or cerebrospinal fluid. IgM is an early antibody produced by the immune system. An early test can be negative if the body has not yet made enough antibody, so testing may sometimes be repeated.

West Nile antibody tests can react with related viruses or remain positive after an earlier infection. A specialised neutralization test may be used to confirm the result, especially when exposure to another flavivirus is possible.

Tests that look directly for viral genetic material are less sensitive once symptoms have started. They may be more useful in people whose immune systems cannot make a typical antibody response.

Brain imaging, such as MRI or CT, helps check for stroke, swelling, or another cause. Imaging can be normal in West Nile encephalitis, so a normal scan does not rule it out. An EEG, which records electrical activity in the brain, may be used when seizures or unexplained changes in awareness are suspected.

Treatment and management

There is no approved antiviral treatment proven to cure West Nile encephalitis. Antibiotics like amoxicillin or doxycycline do not treat it because antibiotics work against bacteria, not viruses.

Treatment is supportive. This means protecting the body while the immune system responds to the infection. Hospital care may include:

At first, clinicians may give treatment for other possible causes of encephalitis, such as herpes virus or bacterial meningitis. These treatments can be adjusted when test results provide a clearer diagnosis.

Several immune-based and antiviral treatments have been studied for West Nile infection. Available evidence has not established them as routine treatment.

Rehabilitation often begins in the hospital. It may continue after discharge if weakness, balance problems, tremor, communication difficulties, or changes in thinking affect daily activities.

- Fluids, oxygen, and nutrition support
- Medicines to control pain, fever, nausea, or seizures
- Monitoring of alertness, swallowing, heart function, and breathing
- Mechanical breathing support if respiratory muscles become weak
- Measures to reduce complications from immobility
- Physical, occupational, speech, or swallowing therapy

Complications

West Nile encephalitis can disrupt several parts of the nervous system. Possible complications include persistent weakness, tremor, poor balance, memory problems, difficulty concentrating, or changes in mood.

Problems with swallowing can allow food or liquid to enter the lungs, causing aspiration pneumonia. Severe muscle weakness may reduce the ability to breathe. Seizures, prolonged reduced awareness, and brain swelling can also occur.

Long hospital stays and limited movement can lead to blood clots, pressure injuries, loss of strength, or other infections. Hospital teams take steps to reduce these risks.

Some neurological damage may be long-lasting, particularly after acute flaccid myelitis. Severe West Nile encephalitis can be fatal, although the outcome cannot be predicted from one early symptom alone.

Prevention

There is no licensed human vaccine against West Nile virus. Prevention focuses on reducing mosquito bites and limiting mosquito breeding around the home.

Helpful measures include:

Mosquito control cannot remove all risk. Taking several protective steps together provides better protection than relying on one measure.

People with a previous infection should continue avoiding mosquito bites. These measures also reduce the risk of other mosquito-borne infections.

- Use an insect repellent registered by your national regulator, following its label
- Wear long sleeves and trousers when mosquitoes are active
- Treat clothing and equipment with permethrin when appropriate, but do not apply it directly to skin
- Use intact window and door screens
- Empty standing water from buckets, plant saucers, gutters, and other containers
- Follow local public health notices about mosquito activity

Living with it and what to expect

The immediate illness may require days or weeks in hospital. Recovery from its neurological effects often takes longer. Improvement may continue over months, and rehabilitation can help you regain strength, movement, communication, or independence.

Fatigue is common during recovery. Some people also notice slower thinking, memory difficulties, headaches, tremor, poor balance, muscle weakness, or changes in sleep and mood. These symptoms may improve gradually, remain stable, or continue long term.

Weakness caused by injury to the nerve cells that control muscles may recover slowly and may not fully resolve. Equipment such as braces, walking aids, or home adaptations can support independence when needed.

Follow-up may involve primary care, neurology, rehabilitation medicine, physiotherapy, occupational therapy, or speech and swallowing therapy. Routine follow-up is appropriate for persistent but stable concerns such as fatigue, memory changes, tremor, reduced mobility, or difficulty returning to work and usual activities.

Recovery is not always steady. A demanding day may temporarily make fatigue or

concentration worse without meaning that the infection has returned. A paced return to activity can help identify what you can manage safely.

West Nile encephalitis does not remain contagious through ordinary contact. Family members and friends can provide personal care without catching it from you.

When to get medical help

Call emergency services for symptoms suggesting inflammation of the brain, spinal cord involvement, or another neurological emergency. These include:

Do not wait for a mosquito bite mark or a known local outbreak. The bite may not be visible, and other serious conditions can cause the same symptoms.

During recovery, seek prompt medical advice for worsening weakness, repeated choking, new fever, increasing confusion, or a major decline in mobility.

Stable fatigue, memory problems, tremor, sleep changes, or difficulty managing daily activities can usually be discussed at a routine follow-up appointment. These symptoms still matter because rehabilitation or practical support may help.

- New confusion, unusual behaviour, or difficulty waking
- A first seizure or a seizure that does not stop
- Sudden muscle weakness or paralysis
- Difficulty speaking, swallowing, or breathing
- Severe headache with fever, neck stiffness, or reduced alertness
- Loss of consciousness

Common questions

Is West Nile encephalitis contagious?

It does not spread through touching, coughing, kissing, or sharing household items. Infection usually comes from an infected mosquito. Transmission through blood donation, organ transplantation, pregnancy, birth, or breastfeeding is possible but rare.

Does every West Nile infection cause encephalitis?

No. Most infections do not affect the brain. Some cause no symptoms, and others cause West Nile fever, with symptoms such as fever, headache, body aches, or rash. Encephalitis occurs when the virus reaches the nervous system.

Can you fully recover from West Nile encephalitis?

Some people recover fully, but recovery may take weeks or months. Others have lasting fatigue, weakness, tremor, memory problems, or reduced mobility. The outlook is influenced by which parts of the nervous system were affected and how severe the initial illness was.

How long does West Nile encephalitis last?

The fever and acute brain inflammation may settle over days or weeks. Neurological recovery often takes much longer. Strength, balance, thinking, and stamina may continue improving for months, although some effects can remain.

Can antibiotics or antiviral medicines cure it?

Antibiotics cannot treat West Nile virus. No antiviral medicine has been proven to cure West Nile encephalitis. Hospital treatment supports breathing, hydration, nutrition, seizure control, and recovery while the immune system responds.

Is there a vaccine for West Nile virus?

There is no licensed West Nile vaccine for people. Vaccines exist for horses, but they are not suitable for human use. Avoiding mosquito bites remains the main form of prevention.

Sources

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