CONDITION

Encephalitis

Encephalitis is inflammation of the brain that can disrupt thinking, movement, behaviour, and consciousness.

WHAT IT IS
Inflammation of brain tissue

BODY SYSTEM
Nervous system

MAIN SYMPTOMS
Confusion, fever, seizures, behaviour changes

WHAT CAUSES IT
Infection, immune reaction, or sometimes unknown

HOW IT IS DIAGNOSED
Spinal fluid tests, MRI, EEG, and blood tests

MAIN TREATMENT
Antiviral, immune, supportive, and rehabilitation treatment

CAN IT BE CURED?
Sometimes - treatable causes may fully resolve

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

LONG-TERM OUTLOOK
Full recovery possible; some have lasting neurological effects

Overview

Encephalitis is inflammation of the brain. It can affect how the brain controls memory, thinking, emotions, movement, speech, and consciousness. Symptoms may develop over hours or days, although some immune-related forms develop over several weeks.

Infections, especially viral infections, can cause encephalitis. It can also happen when the immune system mistakenly attacks the brain. This is called autoimmune encephalitis. Sometimes the cause remains unknown despite extensive testing.

Encephalitis is different from meningitis, which mainly affects the protective layers around the brain and spinal cord. The two conditions can occur together, called meningoencephalitis.

Encephalitis matters because brain inflammation can worsen quickly. Anyone thought to have

it usually needs urgent assessment and treatment in hospital. Early treatment is particularly important when herpes simplex virus or an autoimmune cause is possible.

Symptoms

Encephalitis often causes a change in brain function as well as symptoms of an infection. A person may become confused, unusually sleepy, agitated, or behave in ways that are out of character.

Possible symptoms include:

Autoimmune encephalitis can cause prominent psychiatric or behavioural symptoms. These may include severe agitation, paranoia, hallucinations, rapid mood changes, or unusual movements. These symptoms do not mean the problem is purely psychiatric.

Babies and young children may be difficult to wake, feed poorly, vomit, have seizures, become unusually irritable, or develop a bulging soft spot on the head. Their symptoms may be less specific than those of adults.

- Confusion or difficulty knowing where you are
- Fever, headache, nausea, or vomiting
- Unusual sleepiness or reduced consciousness
- A first seizure or repeated seizures
- New problems speaking, remembering, walking, or controlling movement
- Weakness, loss of sensation, or poor coordination
- Changes in personality, mood, or behaviour
- Seeing or hearing things that are not present
- Sensitivity to light or neck stiffness

Causes and risk factors

Viruses are important causes of infectious encephalitis. Herpes simplex virus, which also causes cold sores and genital herpes, can occasionally reach the brain. This is called herpes simplex encephalitis. It can occur even without a current cold sore or known herpes infection.

Other possible viral causes include varicella-zoster virus, enteroviruses, and viruses spread by mosquitoes or ticks. The relevant infections differ by country, season, travel history, and

exposure. Rabies can cause encephalitis after an infected animal bite or scratch, but it is uncommon in places with effective animal vaccination and access to prompt treatment after exposure.

Bacteria, fungi, and parasites can also cause brain inflammation, although these are less common causes overall.

Autoimmune encephalitis happens when the immune system targets proteins in or around brain cells. Some forms are associated with a tumour, while many are not. It may sometimes follow an infection. Examples include anti-NMDA receptor encephalitis and other antibody-associated forms.

A related condition called acute disseminated encephalomyelitis, or ADEM, causes inflammation in the brain and spinal cord, often after an infection. It is more common in children but can affect adults.

Risk may be higher in very young or older people, those with a weakened immune system, and people exposed to particular mosquitoes, ticks, animals, or infections. However, encephalitis can affect someone without an obvious risk factor.

Diagnosis

There is no single test that identifies every type of encephalitis. Diagnosis is based on symptoms, examination, brain imaging, and laboratory tests. Treatment may begin before the exact cause is known.

A lumbar puncture, sometimes called a spinal tap, is usually important. A clinician places a needle in the lower back to collect cerebrospinal fluid, the clear fluid around the brain and spinal cord. The sample can show inflammation and may be tested for viruses, bacteria, antibodies, and other causes.

Magnetic resonance imaging, or MRI, produces detailed pictures of the brain. It can show patterns of inflammation and help rule out other problems, such as a stroke or tumour. A CT scan may be used when MRI is not immediately available or when a rapid scan is needed.

An electroencephalogram, or EEG, records the brain's electrical activity through small sensors placed on the scalp. It can detect seizures, including seizures that do not cause obvious shaking.

Blood tests may look for infection, immune antibodies, inflammation, or problems affecting other organs. If autoimmune encephalitis is suspected, antibody testing may be performed on both blood and spinal fluid. Tests may also look for an associated tumour. Even after thorough investigation, the cause is not always found.

Treatment and management

Treatment usually starts in hospital. Some people need monitoring in an intensive care unit because of seizures, breathing difficulties, severe agitation, or reduced consciousness.

Intravenous antiviral treatment is commonly started straight away when herpes simplex or varicella-zoster encephalitis is possible. It may be given before test results return because delayed treatment of herpes simplex encephalitis can worsen the outcome. Antibiotics like amoxicillin or doxycycline may also be started if bacterial meningitis or another bacterial infection has not been ruled out.

Autoimmune encephalitis is treated by reducing the harmful immune response. Treatment may include corticosteroids like prednisone or hydrocortisone , intravenous immunoglobulin, or plasma exchange. Other medicines that suppress immune activity may be considered if symptoms continue or return. An associated tumour may also need treatment.

Supportive care is an essential part of treatment. It can include:

Recovery often continues after the inflammation is controlled. Rehabilitation may involve physiotherapy, occupational therapy, speech and language therapy, psychological support, and cognitive rehabilitation for memory or attention problems. Treatment is tailored to the cause and the effects on the individual.

- Medicines to control seizures
- Fluids, nutrition, oxygen, or breathing support
- Treatment for fever, pain, or severe agitation
- Prevention of complications from immobility
- Help with swallowing and communication

Complications

Brain inflammation can leave temporary or lasting changes. Possible complications include epilepsy, memory loss, slowed thinking, fatigue, speech problems, weakness, poor balance, altered behaviour, and changes in mood or personality.

Some people have difficulty planning tasks, coping with noise, or controlling emotions even when their physical recovery appears good. Children may later show changes in learning or development.

Severe encephalitis can affect breathing, swallowing, or consciousness. It can be life-threatening. The risk of lasting problems is influenced by the cause, the part of the brain

affected, the severity of inflammation, and how quickly effective treatment begins.

Prevention

Not every case of encephalitis can be prevented. There is no established way to prevent most autoimmune forms, and herpes simplex encephalitis often occurs without a preventable exposure.

Vaccination can prevent some infections that may lead to encephalitis. Routine vaccines vary by country but may include protection against measles, mumps, rubella, chickenpox, and some other infections. Travel vaccines may be recommended for specific destinations, such as Japanese encephalitis vaccination for certain travellers.

Reducing mosquito and tick bites can lower the risk of infections carried by these insects. Measures include using an appropriate insect repellent, wearing covering clothing, checking for ticks, and following local travel advice.

Wash hands regularly and avoid sharing items contaminated with saliva during outbreaks of some viral infections. After a possible rabies exposure, promptly wash the wound and seek urgent medical advice. Rabies vaccination and antibody treatment given before symptoms begin can prevent the infection from reaching the brain.

Living with it and what to expect

The course of encephalitis differs widely. Some people recover fully, while others have long-term neurological or emotional effects. Recovery may take months or longer and is not always steady. Fatigue, headaches, memory problems, and sensitivity to busy environments may improve slowly or fluctuate from day to day.

A person may look physically well but still struggle with concentration, decision-making, impulse control, or social situations. These less visible effects can affect relationships, education, work, and independence.

Follow-up may involve a neurologist, rehabilitation team, psychologist, or neuropsychologist. Neuropsychological testing examines skills such as memory, attention, language, and problem-solving. It can help identify support needed for returning to school or work.

A gradual return to activity is often easier than trying to resume everything at once. Some people need workplace or educational adjustments, scheduled rest, memory aids, or support with complex tasks.

Seizures may continue after the acute illness, although this does not happen to everyone. Autoimmune encephalitis can sometimes return, so new neurological or behavioural symptoms should be assessed. Routine follow-up is also appropriate for ongoing fatigue, mood changes, memory problems, medication concerns, or difficulty managing daily life.

When to get medical help

Suspected encephalitis is an emergency. Call emergency services for a person with new confusion, severe drowsiness, a seizure, loss of consciousness, sudden major behaviour change, or new weakness-especially when accompanied by fever or headache.

During a seizure, move nearby hazards away, cushion the person's head, and time the seizure. Do not restrain them or put anything in their mouth. Follow emergency-service instructions.

Someone recovering from encephalitis needs urgent reassessment for a new seizure, rapidly worsening confusion, difficulty waking, breathing problems, or new weakness.

For non-emergency concerns, arrange routine follow-up for persistent headaches, fatigue, memory or mood changes, sleep problems, or difficulties returning to ordinary activities.

Common questions

Is encephalitis contagious?

Encephalitis itself is not usually passed directly between people. However, some infections that can lead to it may spread through respiratory droplets, saliva, stool, insects, or animals. Most people who catch one of these infections do not develop encephalitis.

Is encephalitis the same as meningitis?

No. Encephalitis is inflammation of brain tissue. Meningitis is inflammation of the protective layers around the brain and spinal cord. They can cause similar symptoms and may occur together.

How long does recovery from encephalitis take?

Recovery may take weeks, months, or longer. Some people recover fully, while others have lasting problems with memory, seizures, movement, mood, or behaviour. Improvement can continue long after leaving hospital.

Can encephalitis cause permanent brain damage?

It can, but permanent effects are not inevitable. The risk is influenced by the cause, severity, areas of the brain affected, and response to treatment. Rehabilitation can help people regain

skills or adapt to lasting changes.

Can encephalitis come back?

Some forms can return. Relapse is particularly possible with certain types of autoimmune encephalitis. New confusion, seizures, unusual behaviour, or movement problems after recovery need prompt assessment.

Can I drive after encephalitis or a seizure?

Driving may need to stop temporarily or for longer, particularly after a seizure or when attention and reaction time are affected. Licensing rules differ by location. Follow the reporting requirements of the relevant driver-licensing authority and the advice given at follow-up.

Sources

- NHS. Encephalitis
- Tunkel AR, Glaser CA, Bloch KC, et al. The Management of Encephalitis: Clinical Practice Guidelines by the Infectious Diseases Society of America. Clinical Infectious Diseases . 2008;47(3):303-327
- Solomon T, Michael BD, Smith PE, et al. Management of suspected viral encephalitis in adults. Journal of Infection . 2012;64(4):347-373
- Graus F, Titulaer MJ, Balu R, et al. A clinical approach to diagnosis of autoimmune encephalitis. The Lancet Neurology . 2016;15(4):391-404 00401-9)
- Ellul M, Solomon T. Acute encephalitis: diagnosis and management. Clinical Medicine . 2018;18(2):155-159
- Encephalitis International. Information about encephalitis, recovery, and rehabilitation