CONDITION

Rabies

Rabies is a viral infection of the nervous system spread through infected animal saliva.

WHAT IT IS
Viral infection causing severe brain and spinal cord inflammation

BODY SYSTEM
Nervous system

MAIN SYMPTOMS
Fever, bite-site tingling, confusion, difficulty swallowing

WHAT CAUSES IT
Rabies virus spread through infected animal saliva

HOW IT IS DIAGNOSED
Saliva PCR, skin biopsy, blood and spinal fluid antibodies

MAIN TREATMENT
Post-exposure wound care, vaccine, and rabies immunoglobulin

CAN IT BE CURED?
No, symptoms are almost always fatal

IS IT AN EMERGENCY?
Yes, after possible exposure or when symptoms begin

LONG-TERM OUTLOOK
Preventable before symptoms, usually fatal after symptoms begin

Overview

Rabies is an infection caused by viruses in the rabies virus group. It affects the brain and spinal cord. The virus usually reaches people through the saliva of an infected mammal, most often through a bite.

Rabies can be prevented after an exposure if treatment begins before symptoms appear. This treatment is called post-exposure prophylaxis, or PEP. It may include thorough wound cleaning, rabies vaccine, and rabies immunoglobulin, which supplies ready-made antibodies against the virus.

Once rabies symptoms begin, the infection is almost always fatal. This is why any possible exposure needs prompt assessment, even if the wound looks minor or happened while travelling. Do not wait for symptoms or for a wound to become infected.

Dogs cause most human rabies deaths worldwide. In countries where rabies in dogs is well controlled, bats and other wild mammals may be more likely sources. The animals that carry rabies differ by location.

Symptoms

Rabies usually causes no symptoms immediately after exposure. The incubation period-the time between infection and illness-is commonly weeks to months. It can be shorter or much longer. The timing is influenced by factors such as where the virus entered the body and how much virus was present.

Early symptoms can resemble many other infections. They may include:

As the virus affects the brain, symptoms become more specific and severe. Most people develop either an agitated form called furious rabies or a less obvious form called paralytic rabies.

Furious rabies may cause confusion, agitation, hallucinations, unusual behaviour, or periods of apparent calm between episodes. Attempts to drink can trigger painful throat spasms. This is called hydrophobia, meaning "fear of water," although it is caused by difficulty swallowing rather than an ordinary fear. Moving air may also trigger spasms.

Paralytic rabies causes gradually increasing muscle weakness and paralysis. It may begin near the bite and can resemble other nerve conditions. This form may take longer to recognise.

Both forms can progress to seizures, loss of consciousness, breathing failure, and problems controlling heart rate or blood pressure.

- Fever, headache, tiredness, or weakness
- Pain, itching, burning, or tingling at the bite site
- Anxiety, irritability, or difficulty sleeping
- Nausea or loss of appetite

Causes and risk factors

Rabies virus is carried in the saliva and nervous tissue of infected mammals. It most often enters the body through a bite. Scratches can also be a risk if they are contaminated with saliva. Saliva reaching the eyes, mouth, or an open wound may also transmit the virus.

Touching an animal or having saliva on intact skin is not considered a rabies exposure. Rabies

is not normally spread through blood, urine, faeces, clothing, or bedding. Ordinary contact with a person who has rabies does not spread it.

Any mammal can theoretically develop rabies, but the main sources vary around the world. Dogs remain the leading source globally. Bats are an important source in many regions, and their bites may leave little or no visible mark. Foxes, raccoons, skunks, jackals, and mongooses may also carry rabies in certain areas. Small rodents rarely transmit it.

Risk is higher if you:

Human-to-human transmission is extraordinarily rare. A small number of cases have occurred through transplanted organs or tissues. Rabies is not spread through routine social contact.

- Are bitten or scratched by a mammal in an area where rabies occurs
- Have direct contact with a bat and cannot confidently rule out a bite
- Handle wildlife or work with rabies virus
- Enter caves or other places with large bat populations
- Live in or travel to an area where dog rabies is not controlled
- Cannot quickly obtain reliable medical care after an exposure

Diagnosis

After a possible exposure, there is no routine test that can reliably show whether the virus has entered your body. Treatment decisions are therefore based on the animal, the type of contact, local rabies patterns, and whether the animal can be observed or tested. PEP should not be delayed while waiting for symptoms.

If the animal is available, public health or animal health services may arrange observation or laboratory testing. Do not try to capture a wild animal yourself. Avoid damaging the animal's head because brain tissue may be needed for testing.

Diagnosing rabies in a person with symptoms usually requires several samples because no single test is enough in every case. Testing may include:

Doctors also consider symptoms, travel, animal contact, previous vaccination, and other conditions that can cause brain inflammation or paralysis.

- PCR testing to look for viral genetic material in saliva
- A small skin biopsy from the back of the neck
- Blood tests for antibodies against rabies virus

- Testing of cerebrospinal fluid, the fluid around the brain and spinal cord

Treatment and management

If you may have been exposed, wash the wound immediately with plenty of soap and running water for about 15 minutes. If available, a suitable antiseptic can be applied afterward. Thorough washing lowers the amount of virus and does not replace medical assessment.

PEP is highly effective when given correctly before symptoms begin. The exact plan is based on previous rabies vaccination, immune health, the exposure, and local public health guidance.

For someone not previously vaccinated, PEP generally includes a course of rabies vaccine. Rabies immunoglobulin is also used for exposures where it is indicated. As much as possible is placed into and around the wound, with any remainder given elsewhere in the body.

Someone who completed an accepted rabies vaccination course before exposure usually receives additional vaccine but not rabies immunoglobulin. Being vaccinated in advance does not remove the need for prompt care after a bite or other exposure.

Wounds may also need treatment for tissue damage, bacterial infection, or tetanus risk. Antibiotics like amoxicillin or doxycycline do not prevent rabies because rabies is caused by a virus.

If treatment began in another country, keep the names, dates, batch details, and photographs of any vaccine or immunoglobulin records. A specialist or public health service can assess whether the products and schedule were suitable.

Once symptoms have started, there is no established treatment that reliably cures rabies. Hospital care focuses on comfort, breathing and circulation support, seizure control, and support for the person and their family. Experimental intensive-care approaches have not produced consistently successful results.

Complications

The central complication is progressive inflammation and failure of the nervous system. This may lead to:

A bite can also damage nerves, tendons, or joints. Like any animal wound, it may develop a bacterial infection. These problems can need care even when rabies is not present.

PEP can cause short-term effects such as soreness, redness, headache, or fever. Serious reactions are uncommon. Because untreated rabies is so dangerous, minor vaccine reactions

are not usually a reason to stop a recommended course without specialist review.

- Difficulty swallowing and inability to manage saliva
- Muscle spasms or paralysis
- Seizures and loss of consciousness
- Abnormal heart rate or blood pressure
- Breathing failure
- Coma and death

Prevention

Rabies exposure cannot always be predicted, but many cases can be prevented.

Avoid touching, feeding, or handling wild mammals, including animals that appear calm or friendly. Do not approach an animal behaving unusually, such as a nocturnal animal active in daylight. Children should be taught to report any bite, scratch, or animal contact straight away.

Vaccinating dogs is the most effective way to prevent dog-mediated rabies. Keep pets' rabies vaccinations current where vaccination is recommended or required. Report stray animals and animals behaving abnormally to local animal control services.

Pre-exposure rabies vaccination may be recommended for people with ongoing occupational risk, certain laboratory workers, and some travellers. It provides protection before contact but does not eliminate the need for post-exposure vaccine.

Before travel, check whether rabies occurs at your destination and how easily PEP can be obtained. Avoid dogs, cats, monkeys, and other mammals while travelling, even at tourist sites. If an exposure occurs abroad, seek care locally rather than waiting until you return home.

Bat-proofing living areas can reduce indoor contact. If a bat is found in a room with a sleeping person, young child, or someone unable to describe what happened, contact public health or an appropriate medical service promptly for an exposure assessment.

Living with it and what to expect

Most people assessed after a possible exposure do not develop rabies. If PEP is recommended and completed before symptoms begin, it is highly effective. Treatment usually takes place through outpatient visits rather than a hospital stay.

During PEP, keep a clear record of vaccine dates and attend each planned appointment. If a

dose is delayed, seek advice rather than assuming the whole course must be restarted. Public health specialists can help resolve schedule or product questions.

The wait after an animal exposure can be stressful. A wound may be small, and the absence of immediate symptoms can make the risk difficult to judge. Risk assessment focuses on what happened, the animal involved, where the exposure occurred, and whether the animal can be tested-not on how worried you feel or how the wound looks.

PEP prevents infection before symptoms appear; it does not require long-term treatment once the recommended course is complete. Routine follow-up may involve wound review, completion of vaccine appointments, or confirmation of the animal's observation or test result. Antibody blood tests are not routinely needed for every healthy person, but may be used in certain situations.

Clinical rabies has a very different course. Once neurological symptoms begin, the condition usually worsens over days to weeks despite intensive care. Survival has been reported, but it is exceptionally rare, and some survivors have lasting neurological disability.

When to get medical help

Seek urgent, same-day medical or public health advice after:

Wash the area immediately, but do not wait to see whether symptoms develop. If you are travelling, seek local medical help as soon as possible.

Call emergency services or go to an emergency department if someone develops confusion, severe agitation, seizures, new paralysis, breathing difficulty, or painful swallowing spasms after a possible animal exposure. Tell staff about the exposure and where it occurred.

Routine follow-up is appropriate for completing scheduled vaccine doses, checking wound healing, and reviewing records from treatment received elsewhere. New mild soreness after vaccination can usually be discussed at the next planned contact unless it is severe or accompanied by signs of a serious allergic reaction.

- Any bite or scratch from a bat
- Direct bat contact when you cannot rule out a bite or scratch
- A mammal bite in a country or area where rabies occurs
- Saliva from a possibly infected mammal entering your eyes, mouth, or broken skin
- A bite from an animal behaving abnormally or unavailable for assessment

Common questions

Can a small bite give me rabies?

Yes. A bite does not have to be deep or bleed heavily. Bat bites can be especially difficult to see. The need for PEP is based on the exposure and animal, not wound size alone.

Can I get rabies without being bitten?

It is possible, but less common. Scratches contaminated with saliva and saliva entering the eyes, mouth, or an open wound may transmit rabies. Touching an animal or getting saliva on intact skin is not considered an exposure.

How long can rabies stay hidden?

The incubation period is usually weeks to months, but shorter and much longer periods can occur. You should not wait for symptoms after a possible exposure because PEP works before symptoms begin.

Can dogs and cats that look healthy carry rabies?

An infected animal may spread virus shortly before obvious illness. Depending on the animal and local rules, public health or veterinary services may arrange a period of observation or laboratory testing. Appearance alone cannot settle the risk.

Do I need treatment if I had a rabies vaccine before?

You still need prompt assessment after an exposure. Previously vaccinated people generally need additional vaccine doses, but usually do not receive rabies immunoglobulin.

Can you survive rabies after symptoms start?

Survival has occurred, but it is exceptionally rare. There is no treatment that reliably cures symptomatic rabies. Prevention with prompt wound care and PEP is the effective approach.

Sources

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