

Rabies

Introduction

Rabies is a virus that is usually spread by the bite or scratch of an animal. By the time the symptoms appear, it is generally too late to save the patient.

However, a person who may have been exposed to rabies can usually be treated effectively if they seek help at once.

In the United States, between 1 and 3 people contract rabies each year. From 2008 to 2017, the U.S. saw 23 human cases, eight of which were contracted outside the country. Advances in medicine, awareness, and vaccination programs have reduced the incidence of rabies since the 1970s.

Fast facts on rabies

- Rabies is a viral disease that is nearly always transmitted by an infected animal bite.
- Anyone who receives a bite in a geographical area where rabies occurs should seek treatment at once.
- For treatment to be successful, it must be given before symptoms appear.
- Symptoms include neurological problems and a fear of light and water.
- Following the vaccination requirements for pets helps prevent and control rabies.

What is rabies?

Vaccinate dogs and cats to protect them from rabies.

Rabies is a viral infection that mainly spreads through a bite from an infected animal. It is an RNA virus of the rhabdovirus family.

Without early treatment, it is usually fatal.

The virus can affect the body in one of two ways:

- It enters the peripheral nervous system (PNS) directly and migrates to the brain.
- It replicates within muscle tissue, where it is safe from the host's immune system. From here, it enters the nervous system through the neuromuscular junctions.

Once inside the nervous system, the virus produces acute inflammation of the brain. Coma and death soon follow.

There are two types of rabies.

Furious, or encephalitic rabies: This occurs in 80 percent of human cases. The person is more likely to experience hyperactivity and hydrophobia.

Paralytic or "dumb" rabies: Paralysis is a dominant symptom.

Transmission

Rabies is most common in countries where stray dogs are present in large numbers, especially in Asia and Africa.

It is passed on through saliva. Rabies can develop if a person receives a bite from an infected animal, or if saliva from an infected animal gets into an open wound or through a mucous membrane, such as the eyes or mouth. It cannot pass through unbroken skin.

In the U.S., raccoons, coyotes, bats, skunks, and foxes are the animals most likely to spread the virus. Bats carrying rabies have been found in all 48 states that border with each other.

Any mammal can harbor and transmit the virus, but smaller mammals, such as rodents, rarely become infected or transmit rabies. Rabbits are unlikely to spread rabies.

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Symptoms

Rabies progresses in five distinct stages:

- incubation
- prodrome
- acute neurologic period
- coma
- death

Incubation period

This is the time before symptoms appear. It usually lasts from 3 to 12 weeks, but it can take as little as 5 days or more than 2 years.

The closer the bite is to the brain, the sooner the effects are likely to appear.

By the time symptoms appear, rabies is usually fatal. Anyone who may have been exposed to the virus should seek medical help at once, without waiting for symptoms.

Prodrome

Early, flu-like symptoms, include:

- a fever of 100.4 degrees Fahrenheit (38 degrees Celsius) or above
- headache
- anxiety
- feeling generally unwell
- sore throat and a cough
- nausea and vomiting
- discomfort may occur at the site of the bite

These can last from 2 to 10 days, and they worsen over time.

Acute neurologic period

Neurologic symptoms develop, including:

- confusion and aggression
- partial paralysis, involuntary muscle twitching, and rigid neck muscles
- convulsions
- hyperventilation and difficulty breathing
- hypersalivation or producing a lot of saliva, and possibly frothing at the mouth
- fear of water, or hydrophobia, due to difficulty swallowing
- hallucinations, nightmares, and insomnia

- priapism, or permanent erection, in males
- photophobia, or a fear of light

Toward the end of this phase, breathing becomes rapid and inconsistent.

Coma and death

If the person enters a coma, death will occur within a matter of hours, unless they are attached to a ventilator.

Rarely, a person may recover at this late stage.

Why does rabies cause a fear of water?

Rabies used to be known as hydrophobia because it appears to cause a fear of water.

Intense spasms in the throat are triggered when trying to swallow. Even the thought of swallowing water can cause spasms. This is where the fear comes from.

The excess saliva that occurs is probably due to the impact of the virus on the nervous system.

If the individual could swallow saliva easily, this would reduce the risk of spreading the virus to a new host.

Diagnosis

At the time of a bite, there is usually no way to tell for sure whether an animal is rabid, or whether it has passed on an infection.

Lab tests may show antibodies, but these may not appear until later in the development of the disease. The virus may be isolated from saliva or through a skin biopsy. However, by the time a diagnosis is confirmed, it may be too late to take action.

For this reason, the patient will normally start a course of prophylactic treatment at once, without waiting for a confirmed diagnosis.

If a person develops symptoms of viral encephalitis following an animal bite, they should be treated as if they may have rabies.

Treatment

If a person is bitten or scratched by an animal that may have rabies, or if the animal licks an open wound, the individual should immediately wash any bites and scratches for 15 minutes with soapy water, povidone iodine, or detergent. This might minimize the number of viral particles.

Then they must seek medical help at once.

After exposure and before symptoms begin, a series of shots can prevent the virus from thriving. This is usually effective.

Strategies include:

A fast-acting dose of rabies immune globulin: Delivered as soon as possible, close to the bite wound, this can prevent the virus from infecting the individual.

A series of rabies vaccines: These will be injected into the arm over the next 2 to 4 weeks. These will train the body to fight the virus whenever it finds it.

It is not usually possible to find out whether the animal has rabies or not. It is safest to assume the worst and begin the course of shots.

A small number of people have survived rabies, but most cases are fatal once the symptoms develop. There is no effective treatment at this stage.

A person with symptoms should be made as comfortable as possible. They may need breathing assistance.

Prevention

Rabies is a serious disease, but individuals and governments can and do take action to control and prevent, and, in some cases, wipe it out completely.

Strategies include:

- regular antirabies vaccinations for all pets and domestic animals
- bans or restrictions on the import of animals from some countries
- widespread vaccinations of humans in some areas
- educational information and awareness

In rural Canada and the U.S., agencies have dropped baits containing an oral vaccine to reduce the number of wild raccoons with rabies.

In Switzerland, the authorities distributed vaccine-laced chicken heads throughout the Swiss Alps. The foxes immunized themselves by consuming the vaccine, and the country is now almost free of rabies.

Individual precautions

Individuals should follow some safety rules to reduce the chance of contracting rabies.

- Vaccinate pets: Find out how often you need to vaccinate your cat, dog, ferret, and other domestic or farm animals, and keep up the vaccinations.
- Protect small pets: Some pets cannot be vaccinated, so they should be kept in a cage or inside the house to prevent contact with wild predators.
- Keep pets confined: Pets should be safely confined when at home, and supervised when outside.
- Report strays to the local authorities: Contact local animal control officials or police departments if you see animals roaming.
- Do not approach wild animals: Animals with rabies are likely to be less cautious than usual, and they may be more likely to approach people.
- Keep bats out of the home: Seal your home to prevent bats from nesting. Call an expert to remove any bats that are already present.

In 2015, a woman died from rabies after being bitten by a bat during the night. She did not realize she had been bitten.

People are encouraged to seek medical help after an encounter with a wild animal, even if they do not have bite marks or other outward signs of injury.

The World Health Organization (WHO) calls rabies a "100-percent vaccine-preventable disease." They note that at least 70 percent of dogs in an area must be vaccinated to break the cycle of transmission.

In the U.S., vaccinations control rabies in domestic dogs. Nevertheless, between 30,000 and 60,000 people seek rabies post exposure prophylaxis every year, following contact with suspect animals. Hundreds of thousands of animals undergo tests and observation.

Between 60 and 70 dogs and around 250 cats are reported rabid each year in the U.S. Most of these have not been vaccinated, and they were exposed to the virus through wild animals, such as bats.

REFERENCES

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