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Opinion Article

The Impact of Rabies on Brain Inflammation

Yao Ming*

Department of Virology, University of Shandong, Shandong, China

DESCRIPTION

It is one of the oldest known infectious diseases and continues to be a significant public health concern, particularly in developing countries. The study provides an in-depth exploration of the rabies virus, covering its transmission, symptoms, diagnosis, treatment and prevention. Rabies has been recognized for thousands of years, with references dating back to ancient Mesopotamian and Greek texts. The rabies virus belongs to the *Lyssavirus* genus within the Rhabdoviridae family. Despite its long history, rabies remains a major cause of mortality, particularly in regions with inadequate access to medical care and vaccination. The virus travels from the site of the bite through the nervous system to the brain, where it causes acute inflammation.

Transmission

The most common mode of transmission is through bites, but it can also occur through scratches, open wounds, or mucous membranes exposed to infected saliva.

Wild animals: In many parts of the world, rabies is predominantly found in wildlife, including bats, raccoons, skunks and foxes.

Domestic animals: In developing countries, domestic dogs are the main source of human rabies infections. The virus can also infect cats, cattle and other domestic animals.

Human-to-human transmission: Extremely rare but possible through organ transplants or, theoretically, through deep bites or open wounds.

Symptoms and disease progression

The incubation period for rabies can vary widely, typically ranging from one to three months but can be as short as one week or as long as a year or more.

Early symptoms: General weakness or discomfort, Itching or tingling at the site of the bite.

Advanced symptoms: Neurological symptoms such as confusion, agitation and hallucinations, Hydrophobia (fear of water) due to painful throat spasms when trying to drink.

Terminal phase: Once clinical symptoms appear rabies is almost always fatal. The progression from onset of symptoms to death is typically rapid, occurring within days to weeks.

Diagnosis

Direct Fluorescent Antibody test (dFA): This is the most commonly used test and involves examining brain tissue from deceased animals or humans.

Polymerase Chain Reaction (PCR): Used to detect rabies virus RNA in saliva, CerebroSpinal Fluid (CSF) or skin biopsies.

Routine diagnostic tests for rabies in humans are rare unless exposure is suspected. In such cases, tests may include serological assays to detect rabies-specific antibodies.

Treatment

Once clinical symptoms of rabies appear, there is no effective treatment and the disease is almost invariably fatal.

Rabies Immunoglobulin (RIG): Administered to provide immediate passive immunity, particularly if the patient has not been previously vaccinated.

Rabies vaccine: A series of vaccinations is given over several weeks to stimulate the body's immune response and prevent the virus from taking hold.

Induced coma (Milwaukee protocol): An experimental treatment that involves putting the patient into a medically induced coma and administering antiviral drugs.

Prevention

Prevention is the most effective way to control rabies and it involves a combination of vaccination, public health measures and education.

Correspondence to: Yao Ming, Department of Virology, University of Shandong, Shandong, China, Email: zing.yao@edu.cn

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Pre-exposure prophylaxis: Recommended for people at high risk of rabies exposure, such as veterinarians, animal handlers, laboratory workers and travelers to high-risk areas.

Animal vaccination: Regular vaccination of domestic animals, particularly dogs and cats, is important in controlling the spread of rabies.

Animal control: Reducing stray dog populations through spaying/neutering and vaccination campaigns.

Surveillance: Monitoring and reporting rabies cases in animals and humans to track and manage outbreaks.