

Popular Article

Feline rabies: A re-emerging public health concern

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Abstract

Rabies is a uniformly fatal viral encephalitis that causes thousands of deaths worldwide each year. Prevention is the primary approach to the disease. In this discussion, we mainly focus upon feline rabies transmission and the use of active and passive vaccination for pre-exposure prophylaxis and post-exposure treatment of rabies. Human exposure to rabies will always be a possibility, but methods to prevent the disease both before and after exposure to the virus are safe and readily available.

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Introduction

The origin of term ‘rabies’ is from a Latin word ‘rabere’ that means ‘to rage’. It is an important public health issue particularly in the developing countries which are evident from the fact that globally this devastating disease is responsible for more than 60,000 human deaths, while approximately 15 million people receive rabies post-exposure prophylaxis (PEP) annually (Wilde H. et al., 2013). Despite vast efforts made in monetary and epidemiological context, it is still highly prevalent in Asia and Africa continents. There are 20,000 human deaths annually that have been reported in India itself due to rabies (Sudarshan M K et al., 2006). The primary reservoir for rabies is carnivorous mammals throughout the world (Krebs et al., 2005). Below 10% of the documented rabies cases occur in domesticated animals including cats, cattle, and dogs predominantly (Ngobese CE et al., 2009). In India, canine rabies is enzootic with the dogs and jackals as primary reservoirs. Rabies affects more cats than dogs in the United States.

The virus can be passed on to other animals or humans and is fatal if not treated before symptoms appear. According to the American Veterinary Medical Association, 38.4% of households own dogs, making them the most common companion animal with nearly 77 million reported in the United States. Cats are a close second, with 25.4% of households reporting ownership (Burns K. Pet Ownership Stable, Veterinary Care Variable. Avma.org., accessed on 29 May 2022).

Etiology

It is caused by a bullet-shaped virion named rabies virion of the genus *Lyssavirus* of the family *Rhabdoviridae* and *Mononegavirale* order. It is an enveloped virus comprising of 12kb negatively sense single-stranded RNA virus of size around 180 nm x 75 nm in size. The virus affects the central nervous system of mammals. Based on sequence and phylogenetic studies, 7 distinct genotypes of RABV are known to occur in nature (Heaton *et al.*, 1999). The classical RABV (RV-genotype 1) and its field strains are known the world over and cause rabies in a majority of the cases in humans and animals.

Epidemiology

Rabies is prevalent throughout the world except in the Islands. Many of the countries are endemic to rabies, except Australia and Antarctica. The countries free from rabies in the Asian subcontinent are Bahrain, Cyprus, Hong Kong, Japan, Malaysia, Maldives, Qatar, Singapore, Lakshadweep, Andaman and Nicobar Islands of India and Timor-Leste. Countries such as Antigua and Barmuda, Bahamas, Barbados, Belize, Falkland, Jamaica, Saint Kitts and Nevis, Trinidad and Tobago, Uruguay of America subcontinent and Albania, E.Y.R. of Macedona, Finland, Gibraltar, Greece, Iceland, Isle of Man, Malta, Portugal, Norway (except Svalbard), United Kingdom and Spain (except Melill + Ceuta) have also got rabies-free status.

In the Asian continent, the scenario of rabies is worse than in other continents with the fact that among rabies-induced mortality in humans, 15% of mortality occurred in children under 15 years of age with an overall burden of 3 billion cases of rabies annually, and 30,000 human deaths (Yousaf *et al.*, 2012).

Pathogenesis

It's usually transmitted when an infected animal bites another animal or human. The virus starts at the location of the bite and moves through the body along the nerves until it

reaches the brain. Once rabies reaches the brain, the infected animal will begin to show symptoms and will usually die within 7 days.

How can a cat get rabies?

It's usually from the bite of an infected wild animal. Raccoons, skunks, bats, and foxes are common rabies carriers. The more contact a cat has with wild animals or rabid carnivorous mammals such as dogs, the higher the risk of their infection. The CDC reports that there were only 241 cases of rabies in cats in 2018.

How does zoonotic transmission occur?

The transmission of rabies from cats to humans takes place most commonly through bites. A human can get rabies from an animal scratch, but it's very rare.

Signs and symptoms of rabies

After a rabies exposure, the rabies virus has to travel to the brain before it can cause symptoms. This time between exposure and the appearance of symptoms is the incubation period. It may last for weeks to months. The incubation period may vary based upon;

- the location of exposure site,
- the type of rabies virus,
- any pre-existing immunity.

In cats

Behaviour change: Cats who are usually calm may become excitable or agitated.

Extroverted cats may become less affectionate and may isolate themselves.

Aggression: Cats can become excitable, aggressive, and vicious towards humans or other animals.

Drooling: Rabies can affect muscles in a cat's mouth so they can't swallow. They may drool or foam at the mouth.

Loss of muscle control: The final stages of rabies cause paralysis and coma.



Fig.1 Aggressive form of rabies in cat (MSD Vet manual)

In humans:

During the initial stage of the disease;

- Symptoms are similar to flu such as weakness, discomfort, fever, or headache.
- There may be discomfort, prickling, or an itching sensation at the site of the bite.
During later stages;
- Cerebral dysfunction, anxiety, confusion, and agitation.
- A person may experience delirium, abnormal behaviour, hallucinations, hydrophobia (fear of water), and insomnia.

Once clinical signs of rabies appear, the disease is nearly always fatal, and treatment is typically supportive.

Diagnosis

In animals, rabies is diagnosed using the direct fluorescent antibody (DFA) test, which looks for the presence of rabies virus antigens in brain tissue.

In humans, it requires several tests before confirming it as rabies infection along with a history of the physical trauma and look after a period of the dog or cat.

Prevention

The prevention of rabies is the keystone behind the control of the disease. On the primary ground, vaccination of dogs and cats alongside eliminating stray animals and public health education, etc., are the components of animal rabies control as well as

In cats

Pre-exposure vaccination: Killed or inactivated adjuvanted vaccine with the potency of ≥ 2 I.U. should be used with primary vaccination at 90 days of age via subcutaneous route followed by annual vaccination in endemic areas such as India.

Post-exposure vaccination: It involves the vaccination with inactivated or killed adjuvanted vaccine with 5 shot protocol, i.e., starting with day 0 (day of exposure), day 3, day 7, day 14 and day 28.

In humans

Pre-exposure prophylaxis consists of one dose of intramuscular or intradermal injection of vaccine at one site in the deltoid region on days 0, 7 and 21 or 28.

Post-exposure prophylaxis consists of post-exposure prophylaxis (PEP) consists of wound treatment, the administration of rabies vaccines based on WHO recommendations, and if indicated, the administration of rabies immunoglobulin.

- For category I exposure (intact skin and no exposure to virus), only washing of the affected area is needed.

- For category II type exposure (nibbling of uncovered skin, minor scratches, or abrasions without bleeding), immediate vaccination is needed.
- For category III exposure (single or multiple transdermal bites or scratches, contamination of mucous membrane with saliva from licks, licks on broken skin, exposures to bats), immediate vaccination and administration of rabies immunoglobulin are recommended.

Conclusion

Rabies from a cat is a re-emerging disease in the context of modernization of the world. People started keeping cats as their pets which poses them at the risk of getting rabies. The rabies virus gets transmitted to the pet owners via a bite or saliva. Pet owners should vaccinate their pets at regular intervals and prevent the contact of their pets with feral carnivorous animals. If people get any physical injury from their pets, they should have to immediately take medical help.

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