Indian Farmer
Volume 10, Issue 08, 2023, Pp. 381-382
Available online at: www.indianfarmer.net
ISSN: 2394-1227 (Online)

Original Article

OPEN ACCESS

Rabies Virus Infection in farm animals

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Received:02/08/2023 *Published:13/08/2023*

Introduction

Rabies is the zoonotic fatal viral disease that affects warm-blooded mammals. The rabies virus infects the central nervous system transmitted through direct contact by an infected animal. Rabies virus infects neurons and eventually causing disease in the brain and death. Rabies virus can infect any mammal. However, animal species reported to be involved in the transmission of rabies to domestic farm animals are dogs, foxes, wolves, jackals, and vampire bats. Rabies causes economic losses directly to farmer and indirectly to national economy. Rabies in livestock remains underreported in developing countries because most of these countries lack adequate and efficient reporting systems and only clinical diagnosis is accessible. The economic loss caused by canine rabies is estimated to be around 8.6 billion USD, Hampson et al. (2015) mainly due to loss of productivity, premature deaths, costs of post-exposure prophylaxis (PEP), and income loss for seeking Veterinarians assistance. Most rabies human deaths were in Asia and Africa. Estimated rabies human deaths worldwide annually are 55,000, about 31,000 in Asia and 24,000 in Africa. Besides its public health significance, the occurrence of rabies in domestic animals (cattle, sheep, and goats), which are the source of food and income to the poor rural people, had raised its economic importance.

How Rabies is diagnosed in livestock?

As there are neither gross pathognomonic lesions nor specific and constant clinical signs for rabies, confirmatory laboratory diagnosis must be performed. Laboratory diagnosis of rabies is based on the direct detection of rabies viral antigen using different histopathological and serological techniques with the dominance of fluorescent antibody test (FAT). Rabies infection induces the formation of cytosolic protein aggregates called Negri Bodies detected by histopathology. However, this test is no longer recommended for diagnosis. Brain samples are tested using the rapid immuno-chromatographic and direct Fluorescent Antibody assay, Real-time PCR is used as well in different laboratories.

Control measures

In developed countries, where canine rabies is eliminated, the virus may circulate in wildlife. Whereas in most developing countries, the principal reservoir is dogs. The major rabies control strategies are vaccination of susceptible animals, mainly dogs and cats, elimination or control of stray dogs, and pre- and post-exposure vaccination of humans at risk.

Rabies in cattle

Cattle, like other warm-blooded animals, are susceptible to rabies infection. The incidence of rabies in cattle is continuously reported worldwide. In India and Bangladesh, cattle were found to be the most affected domestic animals with rabies (Uddin. H et. al. 2015).
The paralytic form of rabies is the main sign in cattle, but some animals also show depression and excitation. Foaming, bellowing, hitting and biting any object, hazing at humans and other cows were also reported commonly. Rabies virus is transmitted mainly through bites from rabid dogs, which accounts for over 90% of rabies cases. However, vampire bats also transmit rabies in African countries along with foxes and jackals.

Rabies in goats and sheep

In India (Singh. R. et al 2017) has reported 48.7% prevalence of rabies in goats. Goats and sheep show profuse salivation, restlessness, behavioral change, mania and aggression. Goats and sheep are generally presented with history of aggressiveness, excessive bleating, salivation, and paralysis. Some cases of rabies were also presented with nibbling on the metal fence, foamy salivation,

excessive bloating, and inability to eat or drink. Dogs are the primary rabies transmitter to goats and sheep.

Rabies in pigs

Pig rabies is not commonly reported; information about rabies in pigs is scarce. It was noticed that pigs were the least rabies-affected species (1.4%) compared to sheep, cattle, camels, and foxes. Preethi et al. (2020) reported the occurrence of pig rabies for the first time in South India. Observed clinical signs in pigs are anorexia, hyperexcitation, constipation, twitching of the head, and foaming. Jiang et al. (2008) described clinical signs of rabies in pigs, the furious form was seen in almost all infected pigs, and it included hyperexcitation, roaring, and attacks on other pigs. In India, clinical signs in rabid pigs were aggressiveness, inability to stand with violent grunting, paralysis, lateral recumbency, convulsions, rapid chewing, head twitching, hyperexcitation, and profuse salivation, change in vocalization. Like other species, the transmission of rabies in pigs is mainly through dog bites and wild animals,

Rabies in camelids

Camelids are also susceptible to rabies. However, most of the publications described clinical rabies in dromedary camels (*Camelus dromedarius*), with few reports in Bactrian camels (*Camelus bactrianus*). In a review about camel diseases, many rabies cases have been reported in Mauritania, Saudi Arabia, Iran, and Pakistan; infection is usually due to rabid dog bites. Camels with furious rabies form show restlessness, anxiety, salivation, and attacking and biting form followed by terminal paralysis, lateral recumbency and a characteristic flexion of four limbs.

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