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Canine Distemper

Issue Description

Canine distemper is a very serious viral disease affecting animals in the families Canidae, Mustelidae, Mephitidae, Hyaenidae, Ailuridae, Procyonidae, Pinnipedia, some Viverridae and Felidae (though not domestic cats; feline distemper or panleukopenia is a different virus exclusive to cats). It is most commonly associated with domestic animals such as dogs, although ferrets are also vaccinated for it. It is a single-stranded RNA virus of the family paramyxovirus, and thus a close relative of measles and rinderpest. Despite extensive vaccination in many regions, it remains a major disease of dogs.

Other Names

CDV

History

Although very similar to the measles virus, CDV seems to have appeared more recently, with the first case described in 1905 by French veterinarian Henri Carré. It was first thought to be related to the Plague and Typhus and resulted from several species of bacteria. It now affects all populations of domestic dog and some populations of wildlife. A vaccine was developed in 1950, yet due to limited use the virus remains prevalent in many populations. The domestic dog has largely been responsible for introducing canine distemper to previously unexposed wildlife and now causes a serious conservation threat to many species of carnivores and some species of marsupials. The virus contributed to the near-extinction of the black-footed ferret. It also may have played a considerable role in the extinction of the Tasmanian tiger and recurrently causes mortality among African wild dogs. In 1991, the lion population in Serengeti, Tanzania experienced a 20% decline as a result of the disease. The disease has also mutated to form phocid distemper virus, which affects seals.

Infection

Puppies from three to six months old are particularly susceptible. Canine distemper virus (CDV) spreads through the aerosol droplets and through contact with infected bodily fluids including nasal and ocular secretions, feces, and urine 6-22 days after exposure. It can also be spread by food and water contaminated with these fluids. The time between infection and disease is 14 to 18 days, although there can be a fever from three to six days postinfection. Canine distemper virus tends to orient its infection towards the lymphoid, epithelial, and nervous tissues. The virus initially replicates in the lymphatic tissue of the respiratory tract.

The virus then enters the blood stream and infects the lymphatic tissue followed by respiratory, Gastrointestinal, urogenital epithelium, the Central Nervous System, and optic nerves. Therefore, the typical pathologic features of canine distemper include lymphoid depletion (causing immunosuppression and leading to secondary infections), interstitial pneumonia, encephalitis with demyelination, and hyperkeratosis of foot pads.

The mortality rate of the virus largely depends on the immune status of the infected dogs. Puppies experience the highest mortality rate where complications such as pneumonia and encephalitis are more common. In older dogs that do develop distemper encephalomyelitis, vestibular disease may present. Around 15% of canine inflammatory central nervous system diseases are a result of CDV.

Disease progression

The virus first appears in bronchial lymph nodes and tonsils two days after exposure. The virus then enters the blood stream on the second or third day. In older dogs that do develop distemper encephalomyelitis, vestibular disease may present. A first round of acute fever tends to begin around 3 to 8 days after infection which is often accompanied by a low white blood cell count, especially of lymphocytes as well as low platelet count. These signs may or may not be accompanied by anorexia, a runny nose, and discharge from the eye. This first round of fever typically recedes

rapidly within 96 hours and then a second round of fever begins around the 11th or 12th day and lasts at least a week. Gastrointestinal and respiratory problems tend to follow which may become complicated with secondary bacterial infections. Inflammation of the brain and spinal cord otherwise known as encephalomyelitis is either associated with this, subsequently follows, or comes completely independent of these problems. A thickening of the footpads sometimes develops and vesicular pustular lesions on the abdomen usually develop. Neurological symptoms typically are found in the animals with thickened footpads from the virus. About half of sufferers experience meningoencephalitis.

Gastrointestinal and respiratory symptoms

Commonly observed signs are a runny nose, vomiting and diarrhea, dehydration, excessive salivation, coughing and/or labored breathing, loss of appetite, and weight loss. When and if the neurological symptoms develop, urination and defecation may become involuntary.

Neurological Symptoms

The symptoms within the central nervous system include a localized involuntary twitching of muscles or groups of muscles, seizures often distinguished by salivation and jaw movements commonly described as “chewing gum fits.” As the condition progresses, the seizures worsen and the dog may fall to its side, exhibiting grand mal convulsions. The animal may also show signs of sensitivity to light, incoordination, circling, increased sensitivity to sensory stimuli such as pain or touch, and deterioration of motor capabilities. Less commonly it may lead to blindness and paralysis. The length of the systemic disease may be as short as 10 days, or the start of neurological symptoms may not come until several weeks or months later. Those that survive usually have a small tic or twitch of varying levels of severity. With time this tic will usually diminish.

Diagnosis

The above symptoms, especially fever, respiratory signs, neurological signs, and thickened footpads found in unvaccinated dogs strongly indicate canine distemper. However, several febrile diseases match many of the symptoms of the disease and only recently has differing between canine hepatitis, herpes virus, parainfluenza and leptospirosis been possible. Thus, finding the virus by various methods in the dog's conjunctival cells gives a definitive diagnosis. In older dogs that develop distemper encephalomyelitis, diagnosis may be more difficult since many of these dogs have an adequate vaccination history.

Treatment and prevention

There is no specific treatment for canine distemper. The dog should be treated by a veterinarian, usually with antibiotics for secondary bacterial infections, intravenous fluids, and nutritional supplements. The prognosis is poor. In vitro, ribavirin, an antiviral effective in treating measles and other viruses, has also shown effective against Canine distemper virus by means of error catastrophe. More research is now needed in vivo.

There exist a number of vaccines against canine distemper for dogs and domestic ferrets, which in many jurisdictions are mandatory for pets. The type of vaccine should be approved for the type of animal being inoculated, or else the animal could actually contract the disease from the vaccine. A dog who has eaten meat infected with Rinderpest can also sometimes receive temporary immunity. Infected animals should be quarantined from other dogs for several months due to the length of time the animal may shed the virus. The virus is destroyed in the environment by routine cleaning with disinfectants, detergents, or drying. It does not survive in the environment for more than a few hours at room temperature (20-25 °C), but can survive for a few weeks in shady environments at temperatures slightly above freezing. It, along with other labile viruses, can also persist longer in serum and tissue debris.

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