Canine Distemper Virus (CDV)

Canine distemper virus is a highly contagious viral disease that primarily affects dogs. The virus is not a risk to either human health (does not present any symptoms) or food safety.

Virology

Canine distemper virus (CDV) is an enveloped, single-stranded RNA virus that is part of the Paramyxovirus family, specifically the *Morbillivirus* class of viruses, and is closely related to the measles virus, which affects humans. It can also be found in other wildlife such as foxes, wolves, coyotes, raccoons, skunks, mink and ferrets. The virus is very unstable outside the host and is sensitive to lipid solvents and most disinfectants.

CDV initially replicates in the lymphatic tissue of the respiratory tract and spreads rapidly via viremia (spreading infection through the blood) to infect all lymphatic tissues. This is then followed closely by infection of areas such as the epithelium of the respiratory, GI, urogenital systems, as well as the central nervous system and optic nerves. This process can develop within approximately 6 to 9 days. Disease then follows virus replication in these tissues and begins leading to the damage that causes the symptoms of canine distemper.

Clinical Signs

Initially, a high fever may develop 3-6 days after infection, which may subside for several days. Then the fever will usually return, and may also be accompanied by a watery to pus-like discharge from the eyes and nose, as well as signs of dehydration, lethargy, tiredness and anorexia. This is also usually followed by respiratory and GI symptoms such as persistent coughing, vomiting, pneumonia, and diarrhea, and likely will develop secondary bacterial infections.

In later stages of the disease, encephalomyelitis (an inflammation of the brain and spinal cord) will likely develop along with seizures, muscle twitching and other involuntary muscle spasms (such as “chewing fits”, or chewing movements of the jaw), circling, paresis and/or paralysis, and further diminished mental abilities. Dogs may also show signs of severe tooth enamel damage, or enamel hypoplasia, during the course of the disease. This is particularly common in young puppies whose teeth have not fully developed. The disease has also been called the “hard pad disease” due to the development of hyperkeratosis, or the hardening of the foot pads and nose.

A dog may express any or all of the above symptoms during the course of the disease. The course of the systemic disease may be as short as 10 days, but the onset of neurologic signs may be delayed for several weeks or months as a result of chronic progressive demyelination within the CNS.

Distemper is often fatal in dogs, especially for unvaccinated dogs and/or very old dogs and young puppies, with the death rate potentially being as high as 75%. Prognosis may also depend greatly on the strain of CDV as well as the dog's immune response to the virus. Those that do survive usually have permanent, irreparable nervous system damage.

Epidemiology of Transmission

The main route of infection of the Canine distemper virus is via respiratory aerosol droplet secretions from infected animals, such as from contact with infected wildlife or domestic dogs. The virus can also be transmitted by shared food and water bowls and equipment, and can spread rapidly through a kennel.

Some infected dogs may shed the virus for several months after incubation; however they no longer shed the virus once they are fully recovered. In rare cases, mothers with the virus can also pass it onto their offspring through the placenta.

Treatment and Control

There is currently no cure for Canine distemper infection. If a dog is found to be showing symptoms of Canine distemper infection, they should be separated from other dogs and treated for their symptoms in order to try and prevent secondary infections, such as administering fluids to combat dehydration and implementing measures to control vomiting, diarrhea, fever and neurologic symptoms.

The virus is easily inactivated by most commonly approved EPA and Health Canada registered disinfectants. Ensuring fomites and environmental surfaces are properly disinfected can help limit the transmission of the virus. However, the most important prevention method for dogs is through vaccination, particularly when they are young and can build their immunity.

References

Merck Vet Manual – Overview of Canine Distemper ~
http://www.merckvetmanual.com/mvm/generalized_conditions/canine_distemper/overview_of_canine_distemper.html

Pet Education – Distemper in Puppies and Dogs ~
http://www.peteducation.com/article.cfm?c=2+2102&aid=419

Pet Med – Distemper in Dogs ~
http://www.petmd.com/dog/conditions/respiratory/c_dg_canine_distemper?page=2

AVMA – Canine Distemper ~ https://www.avma.org/public/PetCare/Pages/Canine-Distemper.aspx

Remedy's Health Communities – Canine Distemper ~ http://www.healthcommunities.com/canine-distemper/transmission.shtml