Pennsylvania Game Commission Wildlife Disease Reference Library

Canine Distemper

Cause

Canine distemper is one of the most significant diseases of domestic and wild carnivores. It is caused by a highly contagious virus that can infect a variety of species.

Significance

Unvaccinated domestic dogs are susceptible to canine distemper virus (CDV) and the disease is often fatal, but vaccines provide excellent protection and long-lasting immunity. Wildlife that contract the disease have a very high mortality rate. Canine distemper is not known to infect humans.

Species Affected

Canine distemper virus can infect a wide range of domestic and wild carnivores. Canids affected include domestic dogs, coyotes, wolves, and foxes. In Pennsylvania, gray foxes are the most commonly affected species. Domestic and wild felines, including African lions, are also susceptible to the disease. Raccoons, mink, javelinas, and marine mammals have also been diagnosed with CDV. Black-footed ferrets are highly susceptible to the disease, and as a result canine distemper played a major role in the near loss of this species.

Distribution

Canine distemper occurs in wild, captive, and domestic carnivores worldwide. While the disease may occur at any time of year, CDV is more common in domestic dogs in the winter, and is thought to be more common in juvenile wildlife in spring and summer.

Transmission

Close contact between animals is necessary to spread the disease, so CDV presents more of a problem in dense populations. The virus is usually transmitted via inhalation of infected respiratory droplets or direct contact with secretions from the oral cavity, or the eyes. The virus is fragile and cannot survive very long in the environment, so infection from contact with a contaminated environment is rare, though it can occur. The virus is shed from the skin, feces, and urine, which can also be a rare source of infection. At times, the disease is spread via ingestion of contaminated material. CDV

is known to cross the placenta of pregnant dogs, and the same is probably true for wildlife. Animals will shed the virus for up to 90 days after infection, and may also shed the virus while showing no clinical signs.

Clinical Signs

Clinical signs may vary depending on the strain of the virus, the environment, the host species and age, among other variables. Some animals will have a subclinical infection, and will clear the virus with no signs of illness. In general, juveniles are considered more susceptible. For example, the death rate from CDV in domestic mink kits is 90%. Black-footed ferrets and gray foxes are highly susceptible and survival is rare at any age.

Clinically ill animals usually exhibit respiratory and intestinal signs including cough, difficulty breathing, vomiting, diarrhea, and anorexia. They may also be depressed, have poor body condition, and have thickened skin on the nose and footpads. Thick ocular and nasal discharge is a common clinical sign that often leads to crusting around the eyes and nose.

The disease may also cause damage to the central nervous system leading to abnormal behavior, convulsions, paralysis, abnormal head and neck posture, and loss of coordination. Necropsy will often reveal signs of pneumonia including fluid, and dark firm areas in the lungs. The spleen will often be enlarged. In the picture of an raccoon infected with distemper at left note the yellow discharge in the corner of the eye and the twisted neck posture.

Photo courtesy of Dr. Milton Friend

Diagnosis

A presumptive diagnosis of CDV can be reached based on clinical signs along with the microscopic examination of white blood cells from a blood smear or from ocular discharge. Laboratory tests are needed to make a definitive diagnosis. When animals are showing neurological signs, it is important to differentiate CDV from rabies virus.

Treatment

There is no treatment for canine distemper, but wild animals that survive the disease probably develop lifelong immunity.

Management/Prevention

Canine distemper is an important disease of wild carnivores and can be particularly devastating in threatened and endangered species. Transporting wildlife carrying the disease has led to its introduction to naïve populations. Reducing population densities

of susceptible wildlife such as raccoons, foxes, and coyotes can help prevent the spread of disease. Highly effective vaccines are available for domestic animals. There have been some attempts to vaccinate wildlife, but the usefulness of vaccines for wildlife is mostly unknown. Vaccines have been used effectively in the reintroduction of extirpated black-footed ferrets, as well with recovery efforts for the threatened southern sea otter.

Suggested Reading

Black-Footed Ferret Recovery Program. 2009. <http://www.blackfootedferret.org/index.htm>.

Jessup, D. A., M. J. Murray, D. R. Casper, D. Brownstein, and C. Kreuder-Johnson. 2009. Canine distemper vaccination is a safe and useful preventative procedure for southern sea otters (*Enhydra lutra nereis*). Journal of Zoo and Wildlife Medicine 40: 705-710.

Michigan Department of Natural Resources. Wildlife Disease. Canine and feline distemper. < http://www.michigan.gov/dnr/0,1607,7-153-10370_12150_12220-26505--,00.html>.

Tilley, L. P., and F. W. K. Smith, Jr. 2007. Blackwell's five-minute veterinary consult: canine and feline. Fourth edition. Blackwell publishing, Ames, Iowa, USA.

Williams, E. S. 2001. Canine distemper. Pages 50-59 *in* E. S. Williams and I. K. Barker, editors. Infectious diseases of wild mammals. Iowa State University Press, Ames, Iowa, USA.