Canine herpes virus (Canid herpes virus, CaHV-1) is a member of Family Herpesviridae, subfamily Alphaherpesvirinae. Canine herpes virus has world-wide distribution. In Scandinavia, about 86% seropositivity to CaHV-1 has been reported in unvaccinated bitches. Canine herpes virus serological incidence varies in different countries of the world (40-93%). Canine herpes virus host range is canids (dogs, wolves and coyote) due to receptor specificity of the virus. Canine herpes virus does not infect humans. Similarly, human herpesviruses do not infect dogs. Canine herpes virus is monotypic and CaHV-1 is genetically closely related to feline herpes virus. Because CaHV-1 is poorly immunogenic, the diagnosis can be missed based on serology alone. Recovery from herpesviruses is associated with lifelong latent infection with localization to nerve ganglia. Latently infected dogs can convert to seronegative status.

The virus is transmitted by various routes such as oral, aerosol transmission through respiratory route, coughing, sneezing, and in utero route leading to high puppy mortality short time after birth. Canine herpes virus is very labile in the environment. Thus, successful transmission of the virus requires direct contact with nasal and genital secretions. The bitches remain asymptomatic and puppies become anorectic.

Canine herpes virus produces latency in trigeminal and lumbosacral ganglia. Abortion and still birth puppies may also be associated with CaHV-1 reactivation. No CaHV-1 reactivation occurs from PBL. Canine herpes virus is latent in dogs, worldwide. Virus shedding occurs sporadically when animals are stressed by high population density, transportation, pregnancy and immunosuppressive therapy (glucocorticoids). The predisposing factors in newborn puppies include exposure to cold weather leading to hypothermia that allows higher replication of the virus. Keeping the puppies warm is important.

Clinical signs in neonatal puppies include vocalization, anorexia, loss of sucking reflex, abdominal pain, yellow-green soft feces, dyspnea and hypothermia. Petechial hemorrhages occur on mucus membranes. Incubation period is about seven to ten days. Litter mortality of about 100% is possible. Older puppies remain asymptomatic and mount a febrile response. Animals that survive systemic infection can develop persistent neurologic signs, such as ataxia, blindness and cerebellar vestibular deficits.

Reproductive disorders include lesions on penis in male dogs and vaginal hyperemia and lymph follicular lesions in females. In pregnant females, CaHV-1 causes mid-gestation abortions and stillborn puppies.

Respiratory diseases due to CaHV-1 include mild rhinitis, pharyngitis, and pneumonia. Canine herpes virus infections are detected about three to four weeks after introduction of dogs in a kennel. Underlying factors such as immunosuppressant drugs during cancer therapy can exacerbate CaHV-1 induced tracheobronchitis in mature dogs. I have diagnosed few cases of pneumonia in adult dogs with widespread infection of lungs confirmed by CaHV-1 fluorescent antibody test. There are recent reports of CaHV-1 associated acute respiratory disease in three breeds of dogs. The lesions included hemorrhagic rhinitis and tracheitis. No other CIRDC pathogens were detected in this case report of CaHV-1 associated lung disease.1

Ocular disease due to CaHV-1 has been extensively studied, recently. The disease symptoms include conjunctivitis, blepharitis, keratitis, and recurrent eye infections. In newborn puppies, eye infections are bilateral associated with blindness, cataracts, optic nerve atrophy, and retinal degeneration. Dendritic conjunctival ulceration is strongly suggestive of CaHV-1 infection of eye. Spontaneous reactivations of CaHV-1 associated ocular infections are not common.

In adult dogs clinical cases of systemic CaHV-1 have been reported. Lesions include multifocal hepatic necrosis and intranuclear inclusions in liver, adrenal and small intestines. The role of CaHV-1 in neurologic disease needs more work. In other canids, such as Iberian wolves, CaHV-1 infections have been documented.
Canine herpes virus lesions include multifocal areas of necrosis and hemorrhage in lungs, liver, brain, and kidneys. Lesions in very young puppies include red hemorrhagic spots on kidneys. Canine herpes virus causes necrotizing vasculitis. Lymph nodes are swollen and the spleen is enlarged. Genital lesions in older females include vaginal hypraemia and submucosal hemaorrages.

Specimens of choice include fresh frozen kidneys, lungs and liver. For kennel diagnosis, CaHV-1-SN is a test of choice. Canine herpes virus is transmitted to newborn puppies in the birth canal. A breeding kennel can check the potential shedding of CaHV-1 in vaginal swabs just before whelping. If the virus is detected, cesarian section can be used to deliver the puppies to prevent transmission of the virus.

The role of CaHV-1 in canine diseases is expanding because of the availability of more sensitive tools such as CaHV-1 PCR on formalin-fixed tissue sections. If a kennel is experiencing fertility problems, testing for canine herpesvirus exposure by SN test and canine Brucella card test are recommended. Serology indicates that dog has been exposed but may or may not be shedding the virus.

Once the symptoms develop, treatment of puppies with signs of systemic disease has a poor prognosis. Antiviral therapy for CaHV-1 ocular disease includes cidofovir ocular drops 0.5%, one drop twice daily. Trifluridine ophthalmic solution (1%) has been found to reduce virus shedding and lesion scores. Administration of immune plasma by the intra-abdominal route (one to two ml) has been reported to provide some protection. Immune sera can be prepared by pooling sera of bitches that have given birth to CaHV-1 infected puppies. Rearing the puppies in increased temperature (98-100°F) and 50% relative humidity in an incubator reduces losses. Under experimental conditions, the raising the environmental temperature has reduced puppy mortality and lesions. After antiviral therapy, puppies still may have residual lesions in brain and myocardium.

Introduction of CaHV-1 in a kennel can be prevented by serological testing all newly introduced animals for breeding purposes. Problems have been reported in breeding kennels with introduction of an infected animal that can potentially shed CaHV-1 for one week. However, if the CaHV-1 is accidently introduced into a breeding kennel eradication is difficult. In a breeding female, subsequent litters from an affected bitch have a low risk of developing clinical CaHV-1 illness.

A vaccine for CaHV-1 is available in Europe (Eurican herpes 205; contains enriched glycoproteins of the CaHV-1) but not in the USA. A titer of 1:4 on CaHV-1-SN is protective. Vaccination is performed towards the end of pregnancy and boosted at one to two weeks before whelping. The vaccine has been reported to be effective and safe in pregnant bitches. Although the vaccine CaHV-1 is attenuated, vaccine virus can establish latent infections. Due to the low frequency of CaHV-1 outbreaks, demand for commercial CaHV-1vaccine has been less. Canine herpes virus does not survive well outside the host and is susceptible to most disinfectants used for cleaning the surfaces.

References