

Canine Parvovirus

By Dr.K.G.M. De Cramer (2018)

Canine parvovirus is the most common cause of serious enteritis in young dogs. It is a highly contagious disease that occurs worldwide. It remains a serious problem in recently sold puppies and in breeding kennels. Most breeders have either heard of this dreaded disease known as "canine parvovirus" or may have had the misfortune of having lost puppies to it. Parvovirus infection is also known as "catflu" in some countries, but this is a misnomer, as cats have little to do with the virus. The disease is characterised by lethargy, anorexia, vomiting, severe diarrhoea, dehydration and death if not treated promptly. Treatment involves lengthy hospitalisation including intensive fluid and antibiotic therapy. Other causes of gastro-enteritis may mimic parvovirus infection. Corona virus is commonly touted as culprit but plays a minimal role and may only be of importance if associated with parvovirus. It is important for the breeder to realise that parvovirus infection in a breeding kennel may present in a much more severe form as opposed to individual puppies that fall ill after sale at the new owner's home. Puppies of breeders that have several litters of similar age simultaneously, are at increased risk of firstly contracting the disease, secondly develop a severe form and thirdly, dying from it. This is because the parvovirus may start spreading from one pup to the next and from one litter to the next despite hygienic measures and isolation.

What follows is an outbreak of parvovirus in the breeding kennel and a disaster in the making. During an outbreak of parvovirus infection in breeding establishments, a large number of puppies excrete virulent virus, resulting in very high doses of virus available to infect new susceptible puppies. This, in combination with stress factors associated with overcrowding, may explain the observation that the severity of parvovirus associated gastro-enteritis and mortality in breeding kennels, despite treatment, is far greater than that encountered in general practice using the same treatment protocol. Intensive treatment of an infected puppy will usually be successful in about 80% of cases when small numbers are involved. However, in contrast to this, only 20% of puppies may survive despite the same treatment in cases of a parvovirus outbreak. Unfortunately, the cost of treatment may surpass the value of the puppy and hence some breeders and owners may elect to euthanize affected puppies.

In addition, the age of affected puppies tend to be older (7-10 weeks) in pet homes, than those of affected puppies in breeding kennels (5-7 weeks). Parvoviruses are ubiquitous, hardy and may persist for long periods of time in the environment. Large breeding concerns have continuous movement of both animals and people on their premises. These cannot be considered closed isolated kennels. The implication is that the introduction of problems like verminosis, coccidiosis and other causes of gastro-enteritis cannot be adequately controlled.

Keeping a closed kennel and maintaining hygiene are good principles that will decrease risk but certainly not eliminate it all together. Living with the threat of parvovirus may be a source of huge frustration to some breeders. This is because strict isolation and hygienic measures do not always adequately protect against the onslaught by parvovirus. This virus is so ubiquitous that it somehow slips into the kennel. Although direct transmission from dog to dog and indirect transmission via virus carried on shoes clothing and hands are the most likely routes of transmission, phomite transmission of parvovirus is speculated to also be possible. Phomite transmission is where an infectious agent is carried on dust and other particulate matter in the air. This may explain why parvovirus associated enteritis is more common following the windy season in some countries. Another frustrating observation by breeders is the inexplicable occurrence of parvovirus in one kennel whereas the other remains unaffected

despite the fact that the former may have superior management and hygiene. One explanation for this phenomena may be the concept of herd immunity. The herd in this context refers to huge populations of dogs that reside in a geographic area. In areas where herd immunity has been achieved (when the percentage of vaccinated dogs exceeds 50%) this immunity will diminish the circulating virulent virus in that area and help protect many of the unvaccinated animals (domestic and wild) that are susceptible to the disease in question or unprotected animals (puppies that have not completed their vaccination program). This phenomenon may help explain why one breeder consistently reports great success in control of parvovirus and others fail in contaminated environments using identical vaccination protocols. Geographic pockets where herd immunity against parvovirus has been achieved, are generally areas where cultural perceptions favour vaccination and other veterinary expenses on dogs. Breeders finding themselves in such geographic pocket where herd immunity is achieved, erroneously hold the view that they have the "correct recipe" to control parvovirus. If these breeders however, sometime and somehow, introduce parvovirus in the kennel, they will experience the full brunt of parvovirus.

It has been speculated that certain breeds are at higher risk for parvovirus infection than others. Although Rottweilers, American Pit Bull Terriers, Doberman Pinschers and German shepherd dogs are reputedly at increased risk, breeders of other breeds should fully understand that in case of a serious outbreak, parvovirus does not discriminate against breed. Under these circumstances all young susceptible puppies, irrespective of breed are likely to be equally affected.

The cornerstone of prevention of parvovirus infection in young dogs remains vaccination, but this has many shortcomings that require explanation. Puppies acquire immunity from their dam through ingestion of colostrum. If the dam was adequately vaccinated against parvovirus, this colostrum will contain antibodies against parvovirus. If not, the puppies will be susceptible to parvovirus almost immediately after birth. These antibodies protect the puppies against parvovirus for a period which varies from the first 6-10 weeks of life. However, the same antibodies may prevent response to vaccination. Scientists refer to this phenomena as the interference of maternally derived antibodies with vaccination.

Therefore numerous vaccinations, 3-4 weeks apart may be required to adequately immunise a puppy. This has some important implications. This phenomena leaves the puppy vulnerable to parvovirus from the ages of about 6-11 weeks, also called the window of susceptibility.

Early studies following the emergence of parvovirus, demonstrated significant interference by maternally-derived antibody to vaccination of puppies. This observation has aided to advance the practice of accepting six weeks as the earliest age of vaccination against parvovirus. However considering that parvovirus may affect puppies in breeding kennels at a younger age, it thus follows that it may be prudent to vaccinate puppies in infected breeding kennels at 4-5 weeks of age, rather than the standard six weeks in order to shorten the window of susceptibility. Early vaccination (4-5 weeks) against parvovirus is viable and recommended under these circumstances. Special parvovirus vaccines (so called high titre vaccines) registered for this purpose are available in most countries and are effective even in puppies with high levels of maternally-derived antibody.

Veterinary practitioners acting as consultants to large-scale breeders are well aware of the significance of parvovirus infections as a constant threat to susceptible dogs, resulting in high morbidity and mortality. They should acquaint themselves with the use of these vaccines and breeders at risk should enquire about them. These vaccines may save many puppies' lives.

As explained, puppies appear to be at their most vulnerable at around 6-11 weeks. This corresponds with the time that puppies are weaned, vaccinated, wormed, relocated and

exposed to the new owners environment and other pets. This is a very stressful period in a puppies life. It should therefor come as no surprise that recently sold puppies, frequently become infected with parvovirus. This also explains why some breeders and many owners of newly acquired puppies, erroneously hold the view that the parvovirus vaccination caused parvovirus rather than prevent it. All that indeed happened in above scenario, was that the puppy still had enough antibodies in its bloodstream to prevent a proper response to the vaccine but not enough to prevent infection from exposure to the real parvovirus as soon as it left the breeders premises.

Puppies that fall ill soon after sale are a source of frustration to the breeder. This is because the new owners in these cases are likely to claim that the puppy left the breeder already ill or incubating the disease. The incubation period of a disease, refers to the period that lapses between exposure of the puppy to an infectious agent and the onset of symptoms of the disease caused by the infectious agent. In case of parvovirus, the incubation period may be as short as 2-3 days or as long as 10 days. Breeders that consistently have problems with parvovirus soon after sale, should also consider earlier vaccination. Due to the myriad of problems that newly sold pups experience and frustration is brings to the breeder, some breeders elect to sell puppies way after this vulnerable age. In these cases the breeders takes care of adaptation to new food, almost completes their worming and vaccination program and sells them at the age of 11 or so weeks. This practice may not be practical for the larger breeder that will run out of space and hands to care for these puppies. This also exposes the breeder at increased risk of disease outbreak other than parvovirus.

With regards to adult dogs, annual boosting against parvovirus is the norm. There are however vaccines that last longer in dogs that require boosting every third year only. For the time being, every third year vaccination or longer is not recommended in actively breeding bitches. This is because a dam may lose a significant portion of her antibody levels at sequential pregnancies with large litters, which may compromise her ability to adequately protect future litters against infectious disease. It is therefore suggested that, at least in active breeding bitches, annual vaccination against the core diseases not be abandoned until further research suggests that this is safe.

There are small animal vaccines registered for use in pregnant and lactating dogs and they may be used if the bitch requires her annual booster whilst pregnant. The deliberate vaccination of pregnant bitches 2-3 weeks before whelping in addition to annual boosters, is practiced by some breeders and advised by some veterinarians to ensure good colostrum immunity. This practice has no value in bitches that are vaccinated annually.

Breeders that have experienced parvovirus or quick to suspect that vaccine failure may have been the cause. Vaccine failure may be defined as the inability of the vaccine to result in an protective immune response in the vaccinated animal. Although faulty vaccines have been reported, this is very rare indeed. It is true that some individual dogs may be poor responders to vaccines and fail to acquire immunity. If vaccine failure is suspected, large number of cases are expected to be involved and serological studies (studies of antibody levels following vaccination) are indicated and should be requested.

Parvovirus is a common nosocomial (hospital acquired disease). This has important implications for the breeder. Any animal hospital with the best intentions and management, may act as sources of infection to admitted patients. For this reason, extreme care should be taken in veterinary facilities to prevent transmission of disease to puppies when presented for vaccinations. When puppies are however admitted for any ailment, inadvertent transmission of nosocomial disease may be unavoidable. In these cases it is advised that the puppy either remains in the veterinary facility, boarding facility or at the very least, in the quarantine facility

of the breeder until it has completed all of its vaccinations. It may also be homed straight from the veterinarian to its new home where risk of disease spread is minimal. The surest way to trigger a parvovirus outbreak is to introduce a puppy shedding parvovirus from outside the kennel. Translocated puppies are stressed, immune-compromised, more susceptible and thus more likely to, firstly become infected and secondly, shed sufficient virus to infect others.

In summary, it is strongly recommended that current vaccination guidelines for puppies and dogs be followed according to region. In high risk situations, earlier vaccination at four weeks than the accepted norm, should be considered. Reduction, but not complete elimination of parvovirus-induced disease in large breeding kennels or in highly contaminated environments is a realistic expectation using this approach. The control of other pathogens in breeding kennels that act as immune-compromising factors may both aid in prevention of infectious disease and further reduce severity of disease and favour treatment outcome in puppies originating from breeding colonies.

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