CANINE PARVOVIRUS INFECTION

Definition:
Canine parvovirus infection is a preventable infection in dogs that damages multiple body tissues causing severe illness

Signs:
Usually in dogs under six months of age, vomiting, bloody diarrhoea, severe weight loss, abdominal pain, dehydration and a fever

Advice:
Prevention by completing a vaccination program is ideal. Aggressive medical supportive therapy is required with not all dogs surviving. Treatment is complex and may be needed for up to a week or more in isolation care in hospital

OVERVIEW

- Canine parvovirus (CPV) infection is characterized clinically by lack of appetite, vomiting, bloody diarrhea, and weight loss; severe disease may result in generalized bacterial infection (known as "sepsis"), presence of bacterial toxins in the blood (known as "endotoxemia"), blood clotting disorder (known as "disseminated intravascular coagulopathy" or DIC), and acute respiratory distress syndrome (ARDS)
- The original canine parvovirus underwent genetic alterations, developing into CPV-1 and CPV-2; CPV-2 developed further into CPV-2a, CPV-2b and CPV-2c; the original virus is now virtually extinct
- Most severe disease is associated with CPV-2c

GENETICS

- Unknown

SIGNALMENT/DESCRIPTION OF PET

Species

- Dogs
- Cats—can be infected with CPV-2b (closely related to feline panleukopenia virus)

Breed Predilections

- Rottweilers, Doberman pinschers, American pit bull terriers, Labrador retrievers, German

shepherd dogs, and Yorkshire terriers are considered to be more susceptible to canine parvovirus infection than are other breeds of dog; a recent study in Australia demonstrated higher fatality rates in hounds, gun dogs and non-sporting pedigreed dogs than in mixed breed dogs

Mean Age and Range

- Most cases are seen between 6 weeks and 6 months of age
- More severe disease is seen in younger puppies
- Incidence has decreased dramatically with vaccination of puppies against parvovirus

SIGNS/OBSERVED CHANGES IN THE PET

- In pups, it may be fatal following collapse in a shock-like state, they may die without developing digestive upset signs, after only a brief period
- Though very rare now, a heart muscle failure form of the disease was seen in pups more when the disease outbreaks first arose in the late 1970's but now most pups are protected against early infection by the mother's antibodies
- Loss of energy, sluggishness (lethargy), lack of appetite (known as "anorexia"), vomiting, and profuse bloody diarrhea with rapid, severe weight loss
- Rapid heart rate (known as "tachycardia")
- Moist tissues of mouth and eyes (known as "mucous membranes") may be pale (due to blood loss or shock), or deep red due to the blood vessels being filled with blood (known as being "injected"), or yellowish (known as being "icteric" or "jaundiced")
- Dehydration
- Pain or discomfort when the veterinarian feels the abdomen (known as "painful abdominal palpation")
- Intestines may be fluid filled, or rarely, the veterinarian may detect the folding of one segment of the intestine into another segment (known as "intussusception")
- May have a fever or the body temperature may be lower than normal (known as "hypothermia")
- May exhibit vomiting/diarrhea in the examination room

CAUSES

- CPV (canine parvovirus) infection

RISK FACTORS

- Breed predisposition as listed under "Breed Predilections"
- Possible simultaneous conditions, diseases or drug therapy that lead to an inability to develop a

normal immune response (known as “immunosuppression”), such as heavy parasitism, certain bacteria in the gut (e.g., Clostridium spp., Campylobacter spp.), coronavirus

- Incomplete vaccination protocol, vaccine failure, or normal interference of the puppy developing protective antibodies due to the presence of maternal antibodies
- Breeding kennels, pounds, shelters, and areas with a high number of puppies without adequate immune response or inadequately vaccinated puppies are mixed together, especially if crowding, poor sanitation
- < 4 months of age risk of more severe infection

TREATMENT

HEALTH CARE

- Hospitalization for intensive therapy and supportive treatment significantly improves survival
- Hospitalized pets must be kept isolated from other pets; hospital personnel will follow proper cleaning and disinfecting practices to prevent spread of the virus
- Intravenous fluid therapy is a mainstay of treatment; fluid rates must account for maintenance needs plus ongoing losses, which may be profound due to vomiting and diarrhea
- Colloid therapy (using certain fluids with larger molecular weight substances than found in typical IV fluids to expand the plasma volume) may be necessary in pets with low levels of albumin (a protein) in the blood (condition known as “hypoalbuminemia”)
- Antibiotic therapy, anti-vomiting therapy, pain medicine will be used as needed

ACTIVITY

- Activity should be restricted until puppies are recovering

DIET

- Food and water will be withheld if severe vomiting
- Nutrition utilizing some type of feeding tube (known as “enteral nutrition” or “microenteral nutrition”); early enteral nutrition may improve clinical outcome
- Providing nutrition via intravenous therapy (known as “parenteral nutrition”) may be required in severely affected pets though oral feeding is preferred where possible
- Glutamine supplementation has been shown to improve the health of intestinal cells
- A bland, easily digestible diet (such as Hill's Prescription Diet i/d™, Purina Veterinary Diets EN™) should be fed initially, with gradual transition to the normal ration

SURGERY

- The only surgical indication is for treatment of the rare complication of intestinal intussusception (the folding of one segment of the intestine into another segment)

MEDICATIONS

Medications presented in this section are intended to provide general information about possible treatment. The treatment for a particular condition may evolve as medical advances are made; therefore, the medications should not be considered as all-inclusive

- Drugs to stop vomiting (known as “antiemetics”)—very frequently needed due to prolonged vomiting; examples include ondansetron, maropitant
- H2-blockers—cimetidine; ranitidine; famotidine
- Antibiotics—to combat generalized bacterial infection (known as “sepsis”) secondary to the virus infection
- Medications (known as “anthelmintics”) to eradicate intestinal parasites
- Pain relievers (known as “analgesics”)

FOLLOW-UP CARE

PATIENT MONITORING

- Frequent rechecks and physical examinations during treatment

POSSIBLE COMPLICATIONS

- Generalized bacterial infection (sepsis)
- Presence of bacterial toxins in the blood (endotoxemia)
- Shock
- Intussusception (the folding of one segment of the intestine into another segment)
- Blood clotting disorder (disseminated intravascular coagulopathy)
- Diskospondylitis (subsequent to infection)

PREVENTION AND AVOIDANCE

- Vaccination against canine parvovirus has been effective at drastically reducing disease incidence, a recent study showed vaccine at 4 weeks of age with modified live vaccine may be helpful as an additional strategy to hygiene and isolation to reduce the chance of infection, where the environment is contaminated
- Interference from maternal antibodies is the main reason for vaccine failure; some puppies may have maternal antibodies present in their blood for up to 18 weeks of age

- Protocols recommend vaccinating at 6, 9, and 12 weeks of age
- High-risk breeds may require a longer initial vaccination protocol against canine parvovirus, extending up to 22 weeks of age
- Recent studies indicate immunity may last 3+ years after completion of the initial vaccine protocol

EXPECTED COURSE AND PROGNOSIS

- Prognosis is guarded in severely affected puppies
- If the puppy recovers, recovery is typically complete; immunity following canine parvovirus infection is long term and may be lifelong
- Mortality is primarily due to the presence of bacterial toxins in the blood (endotoxemia)
- Aggressive and prompt therapy improves survival, but mortality rates may still approach 20%, poorer prognosis is present when the puppy is very young, underweight or purebred, or there is delay in treatment
- Older puppies with lack of certain markers being present at 24 hrs into treatment have better survival rates
- Co-infection with *Giardia* or other intestinal parasites indicates low hygiene and should be corrected

KEY POINTS

- Canine parvovirus is very stable in the environment, but may be destroyed by use of a 1:30 dilution of household bleach solution in water
- Vaccination does not produce immediate immunity, so susceptible puppies should be kept isolated
- Mortality is primarily due to the presence of bacterial toxins in the blood (endotoxemia)
- Aggressive therapy improves survival, but mortality rates may still approach 20%