Monthly Update
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WHAT'S THE SCOOP WITH THAT POOP? - CANINE PARVOVIRUS PART 2

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This article is the second part of "What's the Scoop with that Poop? - Canine Parvovirus." Last month, the history of the discovery and evolution of Canine Parvovirus as well as its epidemiology were presented. Clinical signs of the virus were also covered. This month's article will describe both general and more specific diagnostics related to Canine Parvovirus, and conclude with treatment options, markers for prognosis and preventative techniques.

GENERAL DIAGNOSTICS:

Though there may be a high suspicion for parvovirus it is important to remember other possible differential diagnoses. Other enteric viruses may cause similar clinical signs such as Coronavirus. Intestinal parasites, foreign material and intussusception must all be considered. A fecal flotation test and Giardia ELISA should be performed to help rule out concurrent internal parasites. (Figure 9) If a positive test result is found proper therapy should also be prescribed as soon as possible. Routine diagnostic testing should be performed on presentation starting with a CBC and chemistry panel. Radiographs and an abdominal ultrasound could also be considered. **For more on General Diagnostics, see attached.**

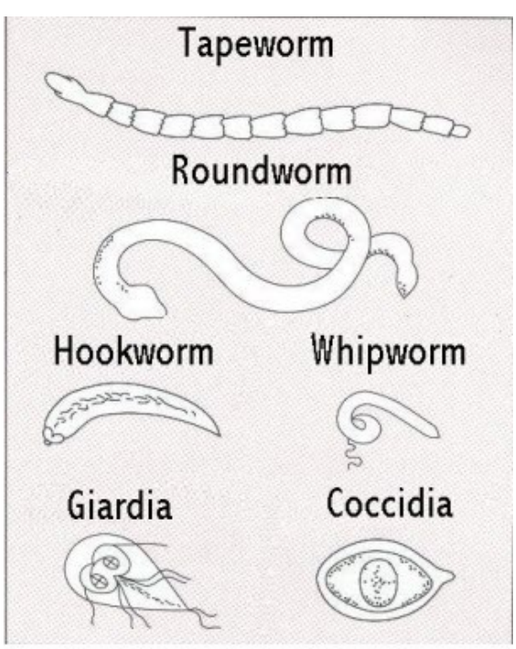

Figure 9: These common canine internal parasites may cause additional intestinal injury if co-infection exists with Canine Parvovirus.

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DEFINITIVE DIAGNOSTICS:

Figure 11: Canine Parvoviral Snap Test

Definitive diagnosis of Canine Parvoviral Enteritis requires detection of the virus in feces, serology and/or necropsy with histopathology. The Parvo Snap Test is the most widely used assay for the diagnosis of canine parvovirus. (Figure 11) It is an in-house fecal antigen ELISA which is performed on a rectal swab specimen. There are several types of this test available from different companies. All detect variants of Canine Parvovirus-2, including 2c but their sensitivities and specificities vary. In general these tests are regarded as accurate and specific. Sensitivity of the tests can be problematic due to transient viral shedding. Antibody present in the sample may also bind potentially available antigen resulting in a false negative result. It has also been suggested that a false positive result can occur several days to a couple weeks after vaccination with a modified live preparation. **For more about Definitive Diagnostics, see attached.**

TREATMENT OPTIONS:

Fluid Therapy: Once positively identified, therapy for Canine Parvovirus can become intensive as these patients are often in critical condition. The mainstay of therapy is supportive care and treatment of potential secondary bacterial infections. Most cases should be placed in isolation. Due to the large amount of fluid losses most patients will be hypotensive and require immediate fluid resuscitation. Fluids are one of the cornerstones of therapy for parvovirus. Ideally they should be administered intravenously. Some pets are so hypovolemic that an intraosseous approach may be necessary. **For more on Fluid Therapy, see attached.**

Monitoring of electrolytes and more importantly the blood glucose concentration is essential. Lack of nutrition, poor absorption and losses secondary to diarrhea and vomiting can lead to hypokalemia and hypoglycemia. Potassium chloride supplementation and dextrose supplementation through the IV fluids is often required. Normalizing the glucose concentration has been shown to be a critical step in patient care for many diseases. A central line placement may be beneficial for sampling, fluid administration, monitoring of central venous pressures.

Antibiotic Therapy: Antibiotic therapy is needed to help resolve secondary bacterial infections from translocation. Antimicrobial drugs with activity against gram-negative and anaerobic bacteria should be chosen, and are best if administered intravenously. **For more on Antibiotic Therapy, see attached.**

Antacid and Antiemetic Therapy: Symptomatic therapy for Canine Parvovirus also includes use of antacids and antiemetic medications. Antacid therapy can be in the form of H-2 blockade with injectable famotidine or proton pump inhibition with injectable pantoprazole. Metoclopramide should be used with caution due to its pro-motility effects as there is a risk of causing an intussusception in the diseased intestinal tract. This makes drugs such as maropitant and ondansetron more appealing.

Enteral Nutrition: Use of antiemetic therapy will help reduce nausea and vomiting which can potentially help increase appetite. This is important because research has concluded that early enteral nutrition is, "the most important stimulus for intestinal growth, repair, and integrity is the presence of nutrients within the gut lumen." The absence of nutrients can lead to further villous atrophy and suppression of crypt cell proliferation. Enteral nutrition is superior to starvation or even total parenteral nutrition in critical illness associated with gut-barrier dysfunction. Appetite has been shown to improve faster with enteral nutrition compared to an NPO group. Earlier repair of the epithelium may also lead to a decrease in bacterial translocation. Placement of a nasoesophageal or nasogastric feeding tubes should be considered as a first line therapy to provide enteral nutrition. Surgical placement of an esophageal feeding tube or PEG tube should be avoided if possible in the critically ill patients.

Figure 13: Tamiflu medication is not recommended for use in dogs by most specialists.

Other Investigated Therapies: There are several other treatments that have been studied for use in parvoviral enteritis. Anti-endotoxin sera, recombinant bactericidal permeability-increasing factor, recombinant granulocyte colony-stimulating factor and recombinant feline interferon-omega are some of the more novel therapies that have been researched. Most of these have not been shown to be beneficial in treatment of the disease. Oseltamivir (Tami-Flu) has also been proposed as a treatment for Canine Parvovirus. The use of oseltamivir remains speculative. (Figure 13) There is concern over how much of the drug is actually absorbed when administered orally to patients with a compromised gastrointestinal tract. A larger concerns lies in the use of a medication that is designed and regulated for use in treating human influenza. Overuse in veterinary medicine could select for resistant influenza viruses resulting in a human pandemic. For now, most researchers agree that this product should not be used for treatment of Canine Parvovirus. **For more on Other Instigated Therapies, see attached.**

PROGNOSIS AND PREDICTORS OF SURVIVAL:

The prognosis for recovery varies with the severity of illness, the owner's financial constraints and the overall viral load per patient. Survival rates of greater than 90% have been reported with aggressive treatment at tertiary referral hospitals. Historically a more severe infection, leukopenia and hypoalbuminemia have all been associated with high mortality rate in multiple studies. **For more on Predictors of Survival, see attached.**

PREVENTION:

Prevention of contracting Canine Parvovirus-2 center around limiting exposure of non-vaccinated or partially vaccinated puppies to infected areas. Proper quarantine of newly acquired animals up to two weeks, isolation techniques, cleaning and disinfection all contribute to prevention. **For more on Prevention, see attached.**

IMMUNITY AND VACCINATION:

Immunity either through survival of natural infection or vaccination remains one of the most important means of preventing spread of the disease. Immunity acquired from surviving a natural infection is thought to be life-long. Both live and modified-live (attenuated) vaccines are available. The modified-live Canine Parvovirus-2 vaccine is used most often. (Figure 14) The killed vaccine provides less duration of immunization but may be recommended in pregnant dogs and puppies less than 5 weeks of age. Use of the attenuated vaccines in pregnant bitches could cause infection of the puppies in utero. The low passage, high-titer vaccines are considered the most effective.

Figure 14: Modified Live Canine Parvovirus vaccine

Vaccination protocols state that the series should be begun at 6 to 8 weeks of age. The puppy should receive a booster every 3 to 4 weeks until no sooner than 16 to 18 weeks of age. A longer course up to 20 to 22 weeks of age is recommended in breeding kennels and in some of the more susceptible breeds of dogs. Then another booster should be administered at 1 year of age and then every 3 years. Puppies should be quarantined at home for 7-10 days after the last booster vaccine is administered as there can be shedding of the virus in feces.

On a final note, Canine Parvovirus variants do not infect humans. Though people can spread the disease on clothing and hands, infection does not develop in the human population. Good hygiene practices are still encouraged as there are other zoonotic infections that cause similar clinical signs in puppies. Some of these can be seen as co-infections with Canine Parvovirus.

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