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Coccidia and *Giardia* Diagnosis, Prevention and Treatment

Coccidia and *Giardia* are both intestinal protozoan parasites that are common in young puppies and kittens and older or debilitated adults. Their management can be difficult and is often misunderstood by practitioners because of the life cycle of the organisms and the development of carrier states whereby the animals may be positive on fecal examination but the animals are asymptomatic (no soft stool or diarrhea).

Giardia

Giardia is a protozoan parasite that is acquired through fecal-oral transmission and develops in the intestinal tract. The cysts are passed in the feces and can live for months outside the host in cool, moist conditions but survives for only a short time, in hot, dry weather, so this is primarily a fall through spring parasite with less cases seen in the summer months unless there is standing water or a water source available. The trophozoites (infective form of the organism) live primarily in the small intestine where they affect nutrient absorption by causing cell injury before developing into cysts and being excreted in the feces. Sometimes with very watery diarrhea trophozoites may be seen in the feces but usually only cysts are seen. The incubation period from ingestion to signs is approximately 7 - 14 days. Reinfection is common and occurs from fecal residue on the haircoat being consumed during self-grooming or from re-ingestion from a contaminated environment.

Disease is seen most commonly in young animals and where animals are more crowded (large kennels, shelters, pet stores, etc). Dogs are most commonly affected by subtypes C and D, cats by subtype F and humans by subtypes A and B. Thus, while *Giardia* can be transmitted to humans from dogs and cats this type of transmission (zoonosis) is unlikely. Approximately 15% of young dogs and 12% of cats may harbor the organism, while only 1-5% of adults do.

Diarrhea is the most common sign noted (large volume, watery – mucoid diarrhea). However, many infections are asymptomatic. The presence and severity of signs depends on multiple factors: the amount of parasite consumed, age, stress level, nutrition and immune status of the animal, and the presence of overcrowded and/or unsanitary conditions. The severity of signs may be worsened by the presence of other intestinal parasites or abnormal intestinal bacteria or protozoans. The diarrhea may be

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acute or chronic, intermittent or continuous, and self-limiting or persistent. Any type of stress or administration of corticosteroids may cause relapse. *Giardia* typically does not cause anorexia, blood in the stool or fever.

Diagnosis is via visualization of cysts on a fecal flotation (with zinc sulfate). Trophozoites are typically only seen on direct smears of fresh feces from animals with very watery diarrhea. Cyst shedding is intermittent, so an animal suspected of *Giardia* may need to have between 3-5 serial flotations performed before considering them negative. Antigen and PCR testing (polymerase chain reaction - a test for small bits of DNA from the organism) may result in false positives because the tests may be positive if there has been a prior exposure and does not always indicate active infections. Dogs and cats may remain positive for months on the antigen test after they have cleared their infection. Combining flotation and antigen testing on multiple samples over several days is recommended to get the best accuracy of testing for an initial diagnosis, but following treatment, only flotation should be used to determine if treatment has been successful. Despite testing, some animals may have diarrhea from *Giardia* but not be positive on testing and in these individuals a trial course of fenbendazole is recommended.

Treatment of patients with diarrhea is via administration of parasiticide or antiprotozoal medications. The first line of treatment is fenbendazole (Panacur® or Safeguard®) for 3-5 days; although a 10 day course may be required in some animals. A combination of febantel-pyrantel-praziquantel (Drontal plus®) may also be effective for 3-5 days in dogs or 5 days in cats. These 2 drugs have very minimal side effects. Some resistance to these two drugs has been documented. Metronidazole is effective in about 50% of cases, but some protozoa have also developed resistance to this antibiotic. Metronidazole may cause side effects of anorexia, vomiting or neurologic symptoms (weakness, disorientation, wobbly gait, seizures and blindness). In symptomatic cases that do not respond to either fenbendazole, Drontal Plus® or metronidazole alone; a course of combination therapy for 10 days is recommended. Other pets in the household should be treated along with the positive dog as they may provide a source for re-infection.

Other less commonly used medications include, albendazole, which is effective but is not usually recommended as it can affect bone marrow production. Furazolidine is less effective and has the side effects of anorexia, lethargy and vomiting. Oxfendazole is effective when combined with bathing and disinfection practices but is not readily available in a form for small animals so must be compounded. Quinacrine is effective but has the side effects of lethargy and fever.

There is some controversy about treating asymptomatic individuals. Some parasitologists and internal medicine specialists recommend treating these animals with one course of fenbendazole or Drontal Plus®, while others feel this is not necessary and that the infection will resolve on its as the animal develops immunity to the organism.

So, depending on the veterinarian's preference, in asymptomatic individuals (and their housemates), a single course of treatment with either fenbendazole or Drontal Plus® may be recommended, along with hygiene and bathing guidelines. There is excellent consensus that no followup treatment is recommended if the animals continues to be positive for cysts after this initial treatment course as long as there are no clinical signs.

Reexposure and recurrence are commonly mistaken for failure to respond to treatment. Cysts in the environment or on the haircoat are constant sources of re-infection. Recommendations include treatment of all group-housed animals whether they are having signs or not; cleaning and disinfection of the environment with steam cleaning and quaternary ammonium compounds (like Roccal-D®); trimming the hair coat around the tail, anus and the area below the anus; daily bathing with a non-medicated shampoo or cleaning this area with baby wipes. Vaccination with the *Giardia* vaccine is not recommended as it has been shown that it doesn't prevent or cure infection and it doesn't reduce cyst shedding. Moving animals away from or adequate cleaning of the contaminated environment and bathing/cleaning the hair coat are extremely important in regards to treatment success.

Animals that do not respond to 1 - 2 courses of single or combination therapy should be screened for other concurrent intestinal parasites, bacterial overgrowth (Clostridium, E coli, Salmonella, Campylobacter, etc), food allergy or inflammatory bowel disease as these may be complicating resolution of signs. *Giardia* is an opportunistic organism and cyst shedding may recur during any type of stress or illness.

While most *Giardia* that are carried by dogs and cats are not transmissible to humans (not zoonotic), a low number of *Giardia* may cause disease in people. So, regardless of the strain a pet has, good hygiene is really important when there is an infected or an asymptomatic carrier animal. Always clean up feces right away and always washing hands after handling feces or bathing the pet.

Key points:

- 1) Dogs and cats with diarrhea should be treated with fenbendazole or Drontal Plus® for 5 days. If they still have diarrhea after this course and are positive for cysts, they should be treated for 10 days with fenbendazole and metronidazole. If they still have diarrhea with cysts after a 10 day course of both medications, they should be evaluated for other causes of small bowel diarrhea and treated for these, allowing the immune system to take care of the *Giardia*.
- 2) Dogs and cats that are asymptomatic (no diarrhea) but have cysts on fecal flotation or direct exam, may be treated once with fenbendazole or Drontal Plus and then not treated again or not treated at all depending on the veterinarian's preference, allowing the immune system to clear the parasite with time.

- 3) Testing following treatment should only be done with zinc sulfate flotation or direct smear, since antigen and PCR tests may remain positive for months despite resolution of infection.
- 4) Hygiene is critical to prevent re-infection – clipping hair around the hind end, wiping with baby wipes after defecation, routine bathing, pick up stool immediately, steam clean where possible or use quaternary ammonium disinfectants, do not allow access to an area where infected stool has been to prevent reinfection.

Giardia. Companion Animal Parasite Council (CAPC).

www.capcvet.org/guidelines/giardia

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Coccidia

There are numerous species of coccidia that are found in dogs or cats. These protozoan parasites inhabit both the large and small intestine. They are transmitted via fecal-oral ingestion or ingestion of a host that contains the parasite (i.e. small rodents). The parasite is common in dogs and less common in cats. Young animals and immunocompromised individuals are most susceptible to disease. Asymptomatic carriers are common. These parasites are very host specific (dog coccidia only affect dogs, cat coccidia only affect cats) and sometimes the oocyst (egg) that is seen passing through an animal is simply due to either fecal-oral transmission or ingestion of a small rodent with the oocysts of another species (pass-through organism).

The oocysts pass through the host in the feces and hatch in the environment. The parasite likes cooler, moist environments, making it a common pathogen in the Pacific Northwest. The oocysts can survive for extended periods of time (over a year) in moist, protected environments as long as there are no extreme hot or cold temperatures. It takes approximately 7 – 10 days for infection to develop. Once hatched, the organism infects the cells that line the small or large intestine. The protozoa develop within the intestinal cells and emerge when the intestinal cells rupture which results in inflammation. This inflammation results in diarrhea. Some forms of the organism will be

latent and may reside in tissues outside of the intestine for long periods of time, returning to the intestine during times of stress and causing relapse of disease and renewed shedding of the organism into the environment.

Diagnosis is made based on signs of large or small volume, watery to bloody diarrhea, depending on the location of infection. Fecal centrifugation flotation with zinc sulfate or evaluation of a direct smear may reveal oocysts. The presence of oocysts does not always correlate with clinical signs (asymptomatic carriers or pass through host may have oocysts in feces but no signs of disease). Therefore, the presence of oocysts in a dog with normal stool, need not be treated as either the oocyst is from a different species or the dog is immune to infection. PCR testing may remain positive for months after resolution of infection, so this testing should not be used to monitor response to treatment. As puppies grow, they will develop immunity to the organism, although they may relapse in times of illness or stress.

Treatment is via antibiotics or coccidiostat products. Sulfadimethoxine (Albon®) is the only labelled product available in dogs (none are labelled for cats). In some cases, the organism may be resistant, necessitating the use of other products. Amprolium (Corid®) is frequently used as a second line of treatment if Albon® doesn't work. Newer drugs developed to treat protozoan diseases in horses, have been used to treat coccidia in dogs (Ponazuril, Toltrazuril, Diclazuril). It is important to remember that we have no data on the safe use of the latter 3 drugs in breeding animals. Decreased eye secretions (dry eye or KCS) may occur with ponazuril. Similar to Giardia, cases that are refractory to treatment, with continued diarrhea, despite 1-2 appropriate courses of different antiprotozoals, should be evaluated for other intestinal disease (bacterial overgrowth, inflammatory bowel disease, food allergy, other intestinal parasites) and then treated for these other causes of diarrhea, allowing the coccidia to resolve as the animal gains immunity to it.

Prevention is via good hygiene. Steam cleaning or prolonged exposure to disinfectants (with ammonia) will kill oocysts. Prompt removal of feces from housing areas is necessary. Treatment of all in-contact animals in the household is recommended to reduce shedding in asymptomatic individuals.

Cryptosporidian are another coccidial parasite that may cause infection in dogs and cats - typically the young or immune compromised are affected. Their oocysts are extremely small and easy to miss on microscopic examination. PCR testing may be needed to make a diagnosis but should not be used to evaluate effectiveness of treatment as the DNA of the parasite may remain present for weeks to months following resolution. Treatment usually requires either Azithromycin for 2 weeks or Tylosin for 3-4 weeks.

Key points:

- 1) Dogs and cats with diarrhea should be treated with sulfadimethoxone (Albon®) and/or amprolium (Corid®) if there is no resolution with Albon®. If they have resistant infection, they may be treated with 1-3 days of ponazuril, toltrazuril or diclazuril. If they still have diarrhea with oocysts after treatment with 1 - 2 rounds of different medications, they should be evaluated for other causes of diarrhea and treated for these, allowing the immune system to take care of the coccidia.
- 2) Dogs and cats that are asymptomatic (no diarrhea) but have oocysts on fecal flotation or direct exam, can be treated once with sulfadimethoxine (if it is confirmed that the oocysts present are pathologic in that species and not just a pass through organism) and then not treated again, allowing the immune system to clear the parasite over time. Alternatively, they do not need to be treated at all, simply allowing the immune system to clear the infection on its own.
- 3) Testing following treatment should only be done with zinc sulfate flotation (preferably with centrifugation), since antigen and PCR tests may be positive for months after resolution of infection.
- 4) Hygiene is critical to prevent re-infection – pick up stool immediately, steam clean where possible, do not allow access to an area where infected stool has been to prevent reinfection.

Coccidia. Companion Animal Parasite Council (CAPC).

www.capcvet.org/guidelines/coccidia

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