

Coccidiosis in a Dog

David S. Lindsay, PhD; Sheila M. Mitchell, BS, PhD Student; Anne M. Zajac, DVM, MS, PhD; Virginia Tech, Blacksburg, Virginia

A 4-month-old, male German shepherd presents with diarrhea. The family is new to the city, having just relocated from several states away the previous week.

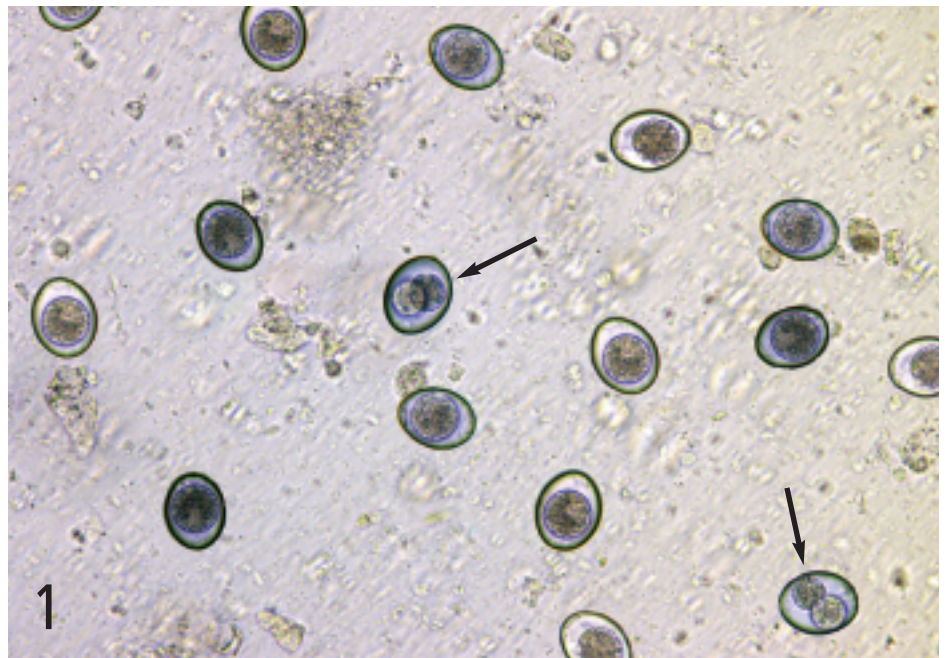
History. The dog had received multivalent vaccines for distemper, hepatitis, parvovirus, and coronavirus at 8 and 12 weeks of age and is on appropriate heartworm preventative. The diarrhea began a few days after the move and the dog was normal until that time. The client reported that the dog's feces have varied in consistency and, on rare occasions, contained small amounts of blood.

The dog has not been eating well since the move, but otherwise seems to be adjusting to the new surroundings. The client indicated that the dog had "escaped" and spent the first night outside rather than in the house. Otherwise, the patient was an inside dog that was only allowed to run in the fenced-in backyard, where the previous homeowners kept pet rabbits in a raised wire cage. The client removed the cages when he moved in, and the dog was often observed digging in the area. The owner collected some of the rabbit feces and brought them in with the dog.

Physical Examination. The dog is slightly dehydrated and has a temperature of 102.8° F.

Laboratory Results. The CBC and blood chemistries are normal. Examination of a fecal flotation test using 33% zinc sulfate solution reveals pear-shaped coccidial oocysts about 40 µm in length (Figures 1 and 2). No *Giardia* cysts were observed. Fecal flotation examination of the rabbit feces revealed numerous coccidial oocysts.

Diagnosis. Intestinal coccidiosis caused by *Isospora canis*. Definitive diagnosis is possible



Numerous *Isospora canis* oocysts in a zinc-sulfate fecal flotation. Note that two of the oocysts have reached the two-cell stage (contain 2 sporoblasts; arrows). (original magnification, 20×).



An oocyst of *Isospora canis* showing two sporoblasts (original magnification, 40×).

due to the large-size oocysts and the presence of two sporoblasts in some oocysts. The other common coccidia of dogs, *I. ohioensis*, has smaller, round oocysts with two sporoblasts.

ASK YOURSELF...

How did this dog get coccidiosis?

- A. From eating rabbit feces at the new house. Even rabbits raised on wire tend to be infected with coccidia.
- B. It is impossible to determine how the dog became infected.
- C. Coccidia do not cause diarrhea in dogs. You should look for *Giardia*, *Cryptosporidium*, or other nonparasitic causes of diarrhea.
- D. Dogs are born infected.

continues

INSIGHTS FROM CLINICAL CASES . DISCUSSION

Correct Answer: B
It is impossible to determine how the dog became infected.

Coccidia are ubiquitous parasites—most dogs are exposed to infection early in life. Clinical disease is usually seen in young dogs and dogs that have been stressed. The dog in this case was stressed by the move and new surroundings, which may have reactivated a latent infection resulting in coccidial diarrhea. Because coccidia are host-specific, the possible exposure to rabbit coccidia described in this case was not related to the patient's disease.

Dogs are definitive hosts for oocysts of *Isospora canis* (present case), *I. ohioensis*, *I. neorivolta*, *I. burrowsi*, *Hammondia heydorni*, *Neospora caninum*, many *Sarcocystis* species, and *Cryptosporidium canis*. Diarrhea is not normally associated with *Sarcocystis* species and *N. caninum* infection. Because dogs eat feces, they can often have spurious oocysts in their own feces. Although rabbit coccidia were not seen in this dog, finding rabbit coccidia or coccidia from rodents, squirrels, or livestock in dog feces is not uncommon. In this case, the rabbit coccidia contaminating the yard were not transmissible, but may have appeared in the dog's feces if he ingested the rabbit feces. This is an example of spurious parasitism and these

oocysts must be recognized and differentiated from true canine coccidial oocysts (Table).

It is almost impossible to remove coccidial oocysts from the environment or prevent exposure of dogs to oocysts. Coccidial oocysts are resistant to disinfectants, including bleach, and remain viable in the environment for many years. Keeping whelping areas clean and dry helps prevent development of oocysts and reduces the numbers available for ingestion by puppies.

Treatment

Sulfadimethoxine (Albon Oral Suspension 5%, Pfizer Animal Health, New York, NY) is commonly used to treat coccidia in dogs. The recommended oral dose is 55 mg/kg body weight, followed by a daily dose of 27.5 mg/kg. The length of treatment will depend on the clinical response and treatment should be continued until the patient is asymptomatic for 48 hours. Maintain adequate water intake and provide supportive care including fluids and a warm, dry environment. Alternative treatments are listed in the Box.

Sulfonamides were the first effective anticoccidials. Sulfadimethoxine and other sulfonamides can be either coccidiostatic or coccidiocidal, depending on the dose. Sulfonamides act by interfering during the early phases in folate synthesis. They are often combined with dihydrofolate reductase/thymidylate synthase inhibitors (pyrimethamine, ormetoprim, trimethoprim) because of the observed synergistic effects resulting from activity at two places in folate

Tx at a glance

- **First day of treatment:** Sulfadimethoxine administered at 55 mg/kg body weight PO, followed by a daily dosage of 27.5 mg/kg. Length of treatment depends on clinical response.

ALTERNATIVE TREATMENTS INCLUDE:

- **A combination of sulfadimethoxine with ormetoprim (Primor, Pfizer Animal Health, New York, NY) administered at 55 mg/kg PO once a day for up to 21 days.**
- **Amprolium: 300 to 400 mg/kg PO once a day for 5 days or 110 to 220 mg/kg for 7 to 12 days. Amprolium is bitter and care should be taken that the dog does not spit it out.**
- **Toltrazuril or ponazuril: 30 mg/kg as a single dose. Administer again in 10 to 14 days if signs reappear.**

biosynthesis. Sulfonamides are most active against the asexual stages of coccidia and have less activity against the sexual stages.

Amprolium is structurally related to the vitamin thiamine and is freely soluble in water. It acts on the first-generation schizont to prevent merozoite production and has some activity against sexual stages and the sporulating oocyst. Toltrazuril and ponazuril have broad-spectrum anticoccidial activity. They are active against both asexual and sexual stages of coccidia. ■

Canine Coccidia or Spurious Oocysts?

Canine coccidial oocysts

- Egg-shaped or spherical (Figure 1)
- No micropyle caps
- No thick walls or walls with extensive modifications
- Canine coccidial oocysts develop quickly and may have progressed to the two-cell stage in fecal samples (*Cryptosporidium canis* and *Sarcocystis* species are excreted sporulated). (Figure 2)

