

ANTIPROTOZOAL DRUGS

Giardia

Giardiasis is a chronic, intestinal protozoal infection seen worldwide in most domestic and wild mammals, many birds, and people. Infection is common in dogs, cats, ruminants, and pigs.

Clinical Findings and Lesions

Giardia infections in dogs and cats may be inapparent or may produce weight loss and chronic diarrhea or steatorrhea, which can be continual or intermittent, particularly in puppies and kittens. Faeces usually are soft, poorly formed, pale, malodorous, contain mucus, and appear fatty. Watery diarrhoea is unusual in uncomplicated cases, and blood is usually not present in faeces. Occasionally, vomiting occurs. Giardiasis must be differentiated from other causes of nutrient malassimilation (e.g. exocrine pancreatic insufficiency and intestinal malabsorption). Clinical laboratory findings usually are normal.

In calves, and to a lesser extent in other production animals, giardiasis can result in diarrhea that does not respond to antibiotic or coccidiostatic treatment. The excretion of pasty to fluid faeces with a mucoid appearance may indicate giardiasis, especially when the diarrhoea occurs in young animals (1–6 mo old). Experimental infection of goat kids, lambs, and calves resulted in a decreased feed efficiency and subsequently a decreased weight gain.

Gross intestinal lesions are seldom evident, although microscopic lesions, consisting of villous atrophy and cuboidal enterocytes, may be present.

Diagnosis

- The motile, pear-shaped trophozoites ($12\text{--}18 \times 7\text{--}10 \mu\text{m}$) are occasionally seen in saline smears of loose or watery faeces.

Treatment

No drugs are approved for treatment of giardiasis in dogs and cats in the USA. Fenbendazole (50 mg/kg/day for 5–10 days) effectively removes *Giardia* cysts from the feces of dogs; no adverse effects are reported, and it is safe for pregnant and lactating animals. This dosage is approved to treat *Giardia* infections in dogs in Europe. Fenbendazole is not approved in cats but may reduce clinical signs and cyst shedding at 50 mg/kg/day for 5 days. Albendazole is effective at 25 mg/kg, bid for 4 days in dogs and for 5 days in cats but should not be used in these species, because it has led to bone marrow suppression and is not approved for use in these species. A combination of praziquantel (5.4–7 mg/kg), pyrantel (26.8–35.2 mg/kg), and febantel (26.8–35.2 mg/kg) also effectively decreases cyst excretion in infected dogs when administered for 3 days. A synergistic effect between pyrantel and febantel was demonstrated in an animal model, suggesting that the combination product may be preferred over febantel alone.

Metronidazole (extra-label at 25 mg/kg, bid for 5 days) is ~65% effective in eliminating *Giardia* spp from infected dogs but may be associated with acute development of anorexia and vomiting, which may occasionally progress to pronounced generalized ataxia and vertical positional nystagmus. Metronidazole may be administered to cats at 10–25 mg/kg, bid for 5 days. Metronidazole benzoate is perhaps better tolerated by cats. Safety concerns limit the use of metronidazole in dogs and cats. A possible treatment strategy for dogs would be to treat first with fenbendazole for 5–10 days or to administer both fenbendazole and metronidazole together for 5 days, being sure to bathe the dogs to remove cysts. If clinical disease still persists and cyst shedding continues, the combination therapy should be extended for another 10 days.

Currently, no drug is licensed for the treatment of giardiasis in ruminants. Fenbendazole and albendazole (5–20 mg/kg/day for 3 days) significantly reduce the peak and duration of cyst excretion and result in a clinical benefit in treated calves. Paromomycin (50–75 mg/kg, PO, for 5 days) was found to be highly efficacious in calves.

Oral fenbendazole may be an option for treatment in some birds.

Adult Parasite: Balantidium



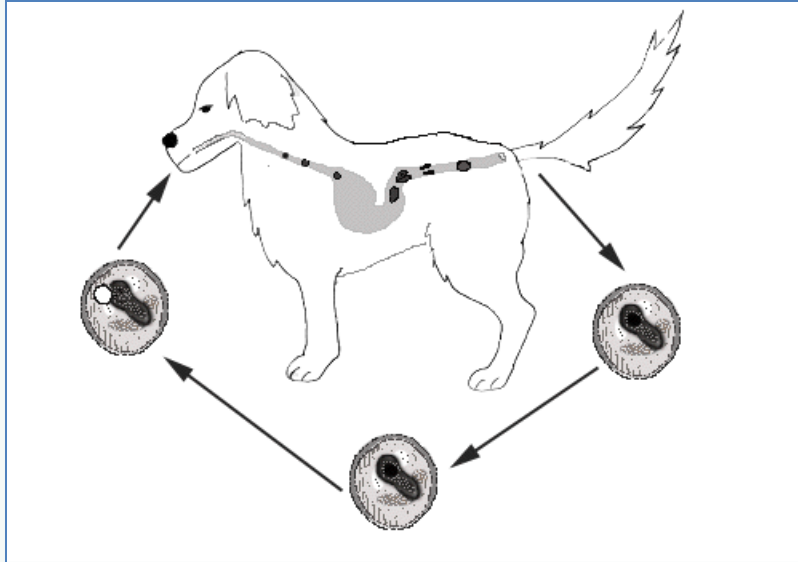
The trophozoite is oval in shape and averages 75 x 50 μm in size, but varies from 30 to 100 μm in width, and 30 to 300 μm in length.

Hosts:

- Pig (*Sus scrofa*), Guinea pig, Dog (*Canis familiaris*) (rarely), Man (*Homo sapiens*), Monkey (various species).

Life Cycle:

Balantidium coli is widely epidemic among the pig population of the world. The adult resides in the large intestine and cecum. Cysts are expelled in feces and reinfect host via accidental ingestion. The parasite excysts in the host intestine. The parasite normally feeds upon fecal material, starch granules, and cell fragments. The ciliates often invade the mucosa and submucosa of the intestines and produce severe ulcers, that are often flask like in shape.



NOTE: *Trichuris suis*, whipworm infection, often occurs in conjunction with *Balantidium coli* infection in pigs.

Site where adult parasite is found in host:

- Large intestine

Diagnostic Stage:

- Adult ciliated organisms
- Cysts are sometimes found.

Common Diagnostic Test

- [Faecal flotation](#)

Clinical Signs:

- Diarrhea
- Weight loss
- Nausea
- Vomiting
- Abdominal pain
- Dysentery
- Weakness
- Poor growth
- Bloody and mucusoid stools

Treatment:

Drug: Metronidazole

- **Dose: Dog and Cat: 30 mg/kg. SID, for 5 days , PO.**

Entamoeba

Clinical Signs

E histolytica is a pathogen with variable virulence. It lives in the lumen of the large intestine and cecum and may produce no obvious clinical signs, or it may invade the intestinal mucosa and produce mild to severe, ulcerative, hemorrhagic colitis. In acute disease, fulminating dysentery may develop, which may be fatal, progress to chronicity, or resolve spontaneously. Chronic cases may show weight loss, anorexia, tenesmus, and chronic diarrhea or dysentery, which may be continual or intermittent. In addition to the colon and cecum, amebae may invade perianal skin, genitalia, liver, brain, lungs, kidneys, and other organs. Signs may resemble those of other colonic diseases (eg, trichuriasis, balantidiasis). Invasive amebiasis is exacerbated by immunosuppression.

Diagnosis

Definitive diagnosis depends on finding *E histolytica* trophozoites or cysts in feces.

Treatment

- **Metronidazole (10–25 mg/kg, PO, bid for 1 wk)**
- **Furazolidone (2–4 mg/kg, PO, tid for 1 wk)**

Pentatrichomonas

See website