

Amebiasis

chapter 1



DEFINITION/OVERVIEW

- Facultative parasitic ameba that infects people and nonhuman primates (including dogs and cats)
- Found primarily in tropical areas throughout the world, although still occurs in North America



ETIOLOGY/PATHOPHYSIOLOGY

- *Entamoeba histolytica*—Dogs and cats become infected by ingesting cysts from human feces.
- Encystment of trophozoites seldom occurs in dogs or cats, so they are not a source of infection.
- One of the few organisms transmitted from man to pets but rarely from pets to man
- Trophozoites (the pathogenic stage) inhabit the colonic lumen as commensals or invade the colonic wall, but can disseminate to other organs (rare) including lungs, liver, brain, and skin.
- Trophozoites damage intestinal epithelial cells by secreting enzymes that lyse cells and disrupt intercellular connections.
- Certain bacteria and a diet deficient in protein increase the virulence of the ameba.
- The host's immune response to invasion exacerbates pathology.
- Colonic ulceration results when trophozoites in the submucosa undermine the mucosa.
- *Acanthamoeba castellanii* and *Acanthamoeba culbertsoni*—free-living species found in freshwater, saltwater, soil, and sewage; can infect dogs
- Infection with *Acanthamoeba* spp. thought to occur by inhalation of organisms from contaminated water or colonization of the skin or cornea. Hematogenous spread or direct spread from the nasal cavity through the cribriform plate to the central nervous system may occur, resulting in a granulomatous amebic meningoencephalitis.



SIGNALMENT/HISTORY

- Mainly young and/or immunosuppressed animals are infected.



CLINICAL FEATURES

Dogs

- *E. histolytica* infections are usually asymptomatic.
- Severe infections result in ulcerative colitis to cause dysentery (may be fatal).
- Hematogenous spread results in organ failure (invariably fatal).
- Granulomatous amebic meningoencephalitis (caused by *Acanthamoeba* spp.) causes signs similar to distemper (anorexia, fever, lethargy, oculonasal discharge, respiratory distress, and diffuse neurologic abnormalities).
- Syndrome of inappropriate secretion of antidiuretic hormone has been reported in a young dog with acanthamebiasis causing granulomatous meningoencephalitis with invasion of the hypothalamus.

Cats

- Colitis causes chronic intractable diarrhea (similar to in dogs).
- Systemic amebiasis has not been reported in the cat.
- *Acanthamoeba* has not been reported in the cat.



DIFFERENTIAL DIAGNOSIS

Dogs

- Causes of bloody diarrhea or tenesmus include the following: constipation; food intolerance/allergy; parasitism (whipworms, leishmaniasis, balantidiasis); HGE; foreign body; irritable bowel syndrome; inflammatory bowel disease; diverticula; infectious (parvovirus, clostridial enteritis, bacterial overgrowth and other bacterial causes, fungal such as histoplasmosis or blastomycosis); neoplasia; ulcerative colitis; endocrinopathy (Addison's disease); toxic (lead, fungal, or plant); and occasionally major organ disease causing colonic ulceration such as renal failure.
- Other causes of diffuse neurologic disease in young animals include the following: infectious (distemper, fungal such as *Cryptococcus*, *Blastomyces*, *Histoplasma*, bacterial, protozoal such as *Toxoplasma* and *Neospora*); toxic (lead, organophosphate); trauma; GME; extracranial (hypoglycemia, hepatic encephalopathy); inherited epilepsy; and neoplasia.

Cats

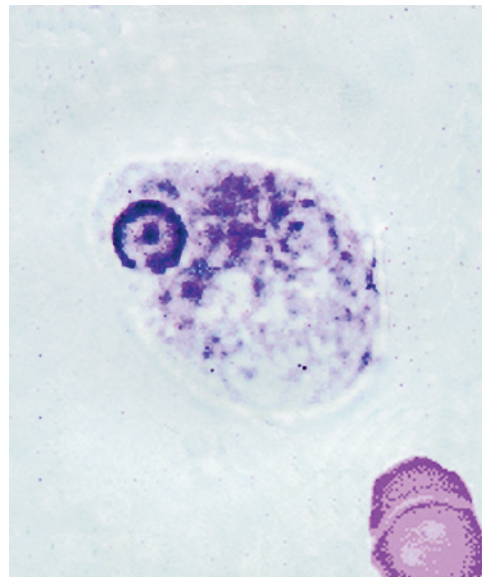
- Other causes of diarrhea include the following: food intolerance/allergy; inflammatory bowel disease; parasitism (giardiasis, parasites such as hookworms, roundworms, tritrichomonas); infectious (panleukopenia, FIV, FeLV producing panleukopenia-like syndrome, bacterial including *Salmonella*, rarely *Campylobacter*); drug (acetaminophen); neoplasia; pancreatitis; and major organ dysfunction.



DIAGNOSTICS

Diagnostic Feature

- **Microscopic examination—Colonic biopsy (H&E) obtained via endoscopy is the most reliable method.**
- Trophozoites in feces are very difficult to detect, although methylene blue staining improves chances (Fig. 1-1).
- Trichrome and iron-hematoxyline are the ideal fecal stains but must be performed in a reference laboratory.
- Fecal concentration techniques are of little help.
- Brain biopsy may be required to definitively diagnose neurologic forms antemortem.
- A dog reported with granulomatous amebic meningoencephalitis due to *Acanthamoeba* showed elevated WBC counts (70% mononuclear cells), protein, and xanthochromia in CSF.



■ **Figure 1-1** Trophozoite of *Entamoeba histolytica* in the feces of a dog. Note the size (about 20 mm) in comparison to the 2 RBCs in the same image (Wright–Giemsa stain, 1500 $\times$).



THERAPEUTICS

- Colitis (caused by *E. histolytica*) responds to metronidazole, although dogs continue to shed organisms.
- Systemic forms (particularly neurologic disease) are invariably fatal despite treatment.

Drugs of Choice

- Tinidazole (44 mg/kg, PO, q24h, for 6 days)—found to be more effective than metronidazole in treating amebiasis in people
- Metronidazole (20 mg/kg, PO, q12h, for 7 days)

Precautions/Interactions

- Tinidazole at the above doses has not been associated with any side effects in dogs.
- High doses of metronidazole (usually >30 mg/kg) for extended periods may cause neurologic signs in dogs.



COMMENTS

- Dogs and cats are an unlikely source of infection in people.
- Pets usually acquire infections from the same source as their owners; veterinarians must warn owners of possible risks.
- People and pets are at risk of exposure to free-living amebiasis from the same environmental sources.
- Immunocompetency often determines whether infection will occur.

Abbreviations

CSF, cerebrospinal fluid; FeLV, feline leukemia virus; FIV, feline immunodeficiency virus; GME, granulomatous meningoencephalopathy; HGE, hemorrhagic gastroenteritis; H&E, hematoxylin and eosin; RBC, red blood cell; WBC, white blood cell.

Suggested Reading

Brofman PJ, Knostman KAB, Dibartola SP. Granulomatous amebic meningoencephalitis causing the syndrome of inappropriate secretion of antidiuretic hormone in a dog. *J Vet Intern Med* 2003;17:230–234.

Fung HB, Doan TL. Tinidazole: a nitroimidazole antiprotozoal agent. *Clin Ther* 2005;27:1859–1884.