

Giardia: A Worldwide Organism

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by
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Illustration by Gary Baseman



Giardia occurs in a variety of settings and with variable symptomatology. Below is a list of people and their experiences with giardia. It demonstrates some of the common presentations and principles associated with this infection.

- *An old man from southern Utah admitted for dehydration*
- *A Boy Scout just back from wilderness camp*
- *A physician just returned from Leningrad (St. Petersburg)*
- *A physician who vacationed in Egypt, who wasn't ill but was embarrassed by the sulfur-smelling gas*
- *A medical technologist who performed ova and parasite exams*
- *A child in a day-care center labeled the "little green man" after his skin developed a yellow-green pigment while being treated with atabrine*
- *A missionary from Guatemala who continued to have intermittent abdominal pain, gas, and diarrhea three years after returning home*
- *A young man with IgA deficiency who had lost 50 pounds and had been treated with five courses of medication without the giardia being eradicated*
- *A young man who had managed to spread giardia to 7 of 10 members of his family*
- *A native Chilean missionary who wrote a thank-you note after being treated, expressing, "I have not felt this good in my entire life"*
- *A one-year-old child diagnosed with "milk allergy and failure to thrive," whose stool showed giardia and whose symptoms were resolved with appropriate treatment*

Giardia is a single-celled protozoan parasite that lives in the duodenal area of the small bowel of many animals, including man. The trophozoite phase of its life cycle is the disease-producing stage when it actively metabolizes food and multiplies by binary fission. The fragile trophozoite changes into a more inert cyst form as it moves down the intestinal tract. The cyst is more resistant to environmental forces and can remain viable in moist environments for four to six weeks. Disease transmission occurs when the cyst is ingested by a susceptible host and matures into a trophozoite, completing the life cycle.

Earlier studies with human subjects have shown that as few as 10 cysts can transmit the disease to a new host. In the United States giardia infections are associated with (1) campers and backpackers who drink untreated or inappropriately treated surface water; (2) large outbreaks associated with contaminated city water systems such as those that occurred in Aspen, Colorado, in 1965 and Tooele, Utah, in 1983; and (3) person-to-person transmission in areas where hygiene tends to be more difficult, such as day-care centers.

About two-thirds of the world's population live in an

environment with inadequate water treatment and poor hygiene. Conditions are considered endemic in most countries of Central America, South America, Asia, Africa, and Eastern Europe. In a study conducted during 1980–83 in Chile, 24 percent of missionaries with symptomatic diarrhea were found to have giardia, and 14 percent of missionaries without symptoms carried the parasite. At one time this illness was referred to as "Leningrad" diarrhea because of the many travelers to this city who returned with giardia.

The initial infection may produce significant symptomatology with abdominal cramping, anorexia, nausea, bloating, diarrhea, and increased gas, often with a sulfuric odor. It is not uncommon for the acute symptoms to resolve and then recur in a milder form every three to four weeks with epigastric discomfort, mild cramping, and diarrhea. These chronic intermittent symptoms may persist for years and may not resolve without specific treatment.

Giardia can also produce a decrease in lactase in the gut resulting in lactose or milk intolerance that may last months after the eradication of the organism. Infants with milk intolerance may actually be infected with giardia.

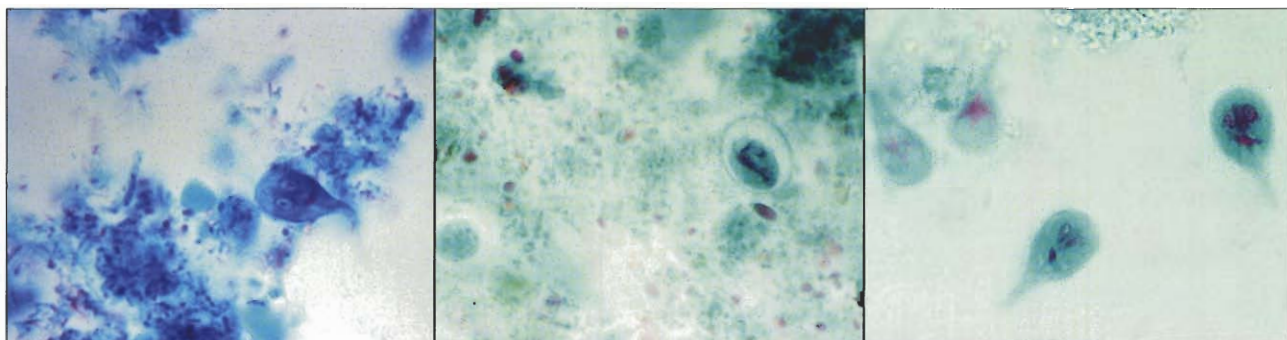
Complete protective immunity does not develop, so reinfection can occur. IgA antibodies do develop against giardia that seem to blunt the symptoms in recurrent or chronic infection. In patients that have more severe recurrent or persistent disease, an IgA level is indicated to evaluate for IgA deficiency.

The diagnosis of giardia is made by ova and parasite (O&P) examination of stool. Since the organism is shed in 10-day cycles, specimens collected at three-day intervals optimize the chance of detection. One stool specimen is 50 percent to 60 percent sensitive, two stool samples bring the sensitivity to about 85 percent, and three specimens detect giardia in about 90 percent of infected individuals.

An antigen detection test on feces appears to be more sensitive in detecting giardia and may be used, especially if giardia is the only organism suspected. In difficult cases where diagnosis is important, a gastric aspirate may also be helpful in finding the organism.

Treatment of giardia includes (1) quinacrine hydrochloride (Atabrine), 100mg three times a day for 10 days, which is 90–95 percent effective, (2) metronidazole (Flagyl), 250mg three times a day for seven days, which is 85–90 percent effective, and (3) furazolidone (Furoxone), available as tablets and a suspension, which is 75–85 percent effective. Outside of the United States, a long-acting metronidazole named tinidazole (Fasigyn) can be prescribed as four 500mg tablets taken at once, with similar efficacy to metronidazole.

In missions where giardia is endemic, a two-gram dose of tinidazole is recommended every six months and when leaving the mission, in an attempt to decrease the incidence



Giardia trophozoites and cysts

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of giardia. The chance of reinfection is so great while in an endemic area, that it is futile to treat for giardia without taking steps to prevent reinfection. Since giardia is so common, it remains the most likely cause of gastrointestinal symptoms when missionaries return home from a country where giardia is endemic.

Missionaries or other travelers who return home with gastrointestinal symptoms should be evaluated with a good history and physical exam. O&P evaluations should be done to evaluate for other parasites besides giardia. If no cause is found, empiric treatment of giardia should be considered, since it is so common in endemic areas and is sometimes difficult to detect.

Prevention of giardiasis in endemic areas is difficult, but the risk is minimized by drinking safe water. Safe drinking water is that which has been boiled for at least two minutes, bottled from reputable companies, bottled or canned as carbonated drinks, or treated using a combination of filtration and chlorination. Chlorination and iodination of water, while effective and useful for bacteria, are not reliable in inactivating giardia cysts.

Maintaining good hygiene reduces risk and is shown to decrease the incidence of giardia in high-risk areas such as day-care centers.

Giardia rarely causes death or severe morbidity. It is not associated with fever or red blood cells or white blood cells in stool. Many people of the world live with mild to moderate symptoms most of their lives, but chronic severe infections do occur and can lead to malnutrition and hypoproteinemia. Thus, in areas of the world where giardia is not endemic and reinfection is unusual, it should be diagnosed and treated in an effort to alleviate the symptoms associated with acute and chronic giardiasis. □

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