Giardia lamblia

Giardia lamblia is a protozoan parasite that causes giardiasis and appears as a pear-shaped trophozoite. Giardia uses a ventral adhesive disk to attach to the small intestinal mucosa, where it disrupts absorption without invading the tissue. Transmission occurs through fecal-oral ingestion of environmentally resistant infective cysts, with an increased risk in travelers, campers, daycare children or close contact with diapered children, and patients with IgA deficiency. Giardiasis commonly causes gas-related symptoms, such as bloating, cramping, and flatulence, along with greasy, foul-smelling diarrhea. Diagnosis is commonly made with stool-based testing, and infection is often self-limited but symptomatic cases may require antiparasitic treatment with tinidazole, nitazoxanide, or metronidazole.



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Pathophysiology

Protozoan Parasite
Propeller-protozoa
Giardia lamblia, also known as Giardia duodenalis or Giardia intestinalis, is a flagellated protozoan parasite that causes giardiasis. As a protozoan, Giardia is a unicellular eukaryotic organism.

Pear-shaped, Multinucleated Trophozoite
Pear-shaped Multi-nuclear Trophy
Giardia trophozoites are pear-shaped and multinucleated. Classically, they have two anterior nuclei, giving them a face-like appearance on microscopy. Mature cysts contain four nuclei, while immature cysts contain two nuclei.

Ventral Adhesive Disk
Attaching to Small Intestine Border
Giardia uses a ventral adhesive disk to attach to the mucosal lining of the small intestine. This attachment occurs without tissue invasion but can disrupt normal small intestinal absorptive function and contribute to malabsorption.

Transmission & Risk Factors

Ingestion of Infective Cysts
Sisters
Transmission occurs through the fecal-oral route by ingestion of infective Giardia cysts. These environmentally resistant cysts live in the gut of infected people or animals and are excreted in stool. Giardia can survive in contaminated water, food, soil, or on contaminated surfaces for weeks to months. Infection occurs when the cysts are ingested through contaminated hands, surfaces, food, or water.

Travelers, Campers, and Daycare Exposure
Traveler's Map, Tent and Children
Common risk factors for Giardiasis include international travel, camping or hiking, daycare exposure, and close contact with diapered children. Risk increases when people swallow contaminated recreational or untreated water, such as from swimming pools, splash pads, lakes, or rivers. Children are more likely than adults to become sick, especially those in daycare settings.

Predisposed with IgA Deficiency
(IgA) Apple-goblin
Patients who are immunocompromised with IgA deficiency are more susceptible to Giardia infection because IgA plays an important role in mucosal immunity. Without adequate IgA, patients may be at increased risk for recurrent, prolonged, or chronic giardiasis.

Signs and Symptoms

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Bloating
Bloated-balloon
Bloating is a common symptom of giardiasis and may result from excess intestinal gas and malabsorption. Patients may also complain of abdominal cramping, distention, or discomfort.

Flatulence
Farting
Flatulence is a common symptom of giardiasis due to increased intestinal gas. Patients may also experience belching, bloating, or abdominal distention.

Fatty Diarrhea
Bacon-toilet-water
In addition to gas-related symptoms, Giardiasis can cause fatty or greasy, foul-smelling diarrhea due to small intestinal malabsorption. Diarrhea may occur 2 to 5 times per day and may appear greasy, fatty, foul-smelling, or floating, and can contribute to dehydration. Symptoms usually begin 1 to 2 weeks after infection and may last 2 to 6 weeks, or longer in immunocompromised patients. Fever and bloody diarrhea are not typical symptoms associated with Giardiasis.

Diagnosis

Stool Antigen Testing
Stool Ant-gems
Diagnosis of giardiasis is commonly made using stool-based testing, including stool antigen testing or molecular testing such as PCR. Stool ova and parasite testing may also confirm the diagnosis by identifying Giardia cysts or trophozoites in fecal specimens, though multiple stool samples may be needed. Less commonly, duodenal sampling or biopsy may show trophozoites adjacent to the epithelial brush border.

Treatment

Often Self-Limited
Self-closing
Many cases of giardiasis are self-limited, but symptoms can be prolonged and dehydration should be addressed. Supportive care includes oral rehydration for mild dehydration and IV fluids with electrolyte replacement for more severe fluid losses. Antiparasitic treatment is used for symptomatic patients and may be considered for certain asymptomatic patients at higher risk of transmission or complications.

Nitazoxanide
Night-socks
Nitazoxanide is an FDA-approved effective antiparasitic treatment option for giardiasis. Nitazoxanide oral suspension is used for pediatric dosing in younger children, while tablets are indicated for patients 12 years and older. Nitazoxanide requires a multi-day course. Treatment choice depends on patient age, pregnancy status, availability, tolerability, and clinical context.

Tinidazole
Martini
Tinidazole is an FDA-approved effective antiparasitic treatment option for giardiasis in adults and children aged 3 years and older. It is often convenient because it can be given as a single-dose regimen when appropriate. For patients unable to swallow tablets, tinidazole tablets may be crushed and compounded into an oral suspension, which can help with pediatric administration.

Metronidazole
Metro-knight
Metronidazole is a widely used antiparasitic treatment option for treating symptomatic giardiasis, although it is not FDA approved for giardiasis treatment. It typically requires a multi-day course and may cause gastrointestinal side effects or a metallic taste, but it remains a common standard therapy.

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