



NOTES

GASTROINTESTINAL INFECTIONS

GENERALLY, WHAT ARE THEY?

PATHOLOGY & CAUSES

- Gastrointestinal tract (GIT) inflammation caused by virus, bacteria, other parasites
- GIT mucosa inflammation → ulceration → epithelial disruption → edema, bleeding → fluid, electrolyte loss (diarrhea) → dehydration, electrolyte imbalance, anemia (bloody diarrhea)
- Mainly fecal-oral transmission

RISK FACTORS

- Living/traveling to endemic areas, youth, immunosuppression (e.g. corticosteroid treatment, HIV co-infection), malnutrition, poor hygiene

SIGNS & SYMPTOMS

- Fever, diarrhea, abdominal pain (cramps)
- Dehydration
 - Sunken eyes, dry mouth, decreased urination, dark yellow urine (deep amber—severe), dry skin, syncope

DIAGNOSIS

- Pathogen-dependent

LAB RESULTS

- Stool culture

TREATMENT

- Rehydration
- Antimicrobial therapy (pathogen-dependent)

CRYPTOSPORIDIUM

osms.it/cryptosporidium

PATHOLOGY & CAUSES

- **Cryptosporidiosis:** diarrheal disease caused by *Cryptosporidium* (intestinal intracellular protozoan parasite)
- Life-cycle can be completed in one host
 - **Immunocompetent hosts:** self-limited diarrhea
 - **Immunocompromised hosts:** life-threatening complications

CAUSES

- *Cryptosporidium* oocysts (infective form) transmitted via fecal → oral route
 - Infected individual/animal feces contaminates food; drinking, swimming water → fecally-contaminated food/water ingestion
- Parasites → intestinal epithelial inflammation → villi structure distortion → ↓ absorption, ↑ secretion → watery diarrhea
 - Sclerosing cholangitis/acalculous cholecystitis, respiratory cryptosporidiosis, pancreatitis

RISK FACTORS

- Endemic-area exposure (tropical countries, Kuwait), immune deficiencies, poor hygiene
- **Interpersonal transmission:** sexual partners, daycare centers, household members

COMPLICATIONS

- Dehydration, fluid and electrolyte imbalance

SIGNS & SYMPTOMS

- Host's immune status-dependant

DIAGNOSIS

LAB RESULTS

Microscopic oocyte identification

- Stool; bile secretion, affected GIT aspirates; affected GIT tissue biopsy; respiratory secretion

Polymerase chain reaction (PCR)

- More sensitive, specific
- Differentiates between *Cryptosporidium* genotypes

Monoclonal antibodies and enzyme immunoassays (EIA)

- Monoclonal antibody test against oocyst wall
- More sensitive, specific than light microscope

TREATMENT

MEDICATIONS

- **Immunocompetent host:** antidiarrheal, antimicrobial agents
- **Immunocompromised host:** antiretroviral therapy (HIV-infected individuals), antimicrobial agents, azithromycin (severe diarrhea)

OTHER INTERVENTIONS

- **Immunocompetent host:** oral/IV fluid/electrolyte-loss replacement

CRYPTOSPORIDIOSIS SIGNS & SYMPTOMS

IMMUNOCOMPETENT HOSTS	IMMUNOCOMPROMISED HOSTS
Watery diarrhea (5-10 days)	Bloody diarrhea (> 10 days)
Abdominal pain (cramps)	Right upper-quadrant abdominal pain (cholecystitis, cholangitis)
Low-grade/absent fever	Fever
Usually no respiratory symptoms	Respiratory symptoms (dyspnea, cough, wheezing, etc.)



Figure 74.1 Cryptosporidium organisms lining the crypt epithelium in an infected individual.

ENTAMOEBIA HISTOLYTICA (AMOEBIASIS)

osms.it/entamoeba-histolytica

PATHOLOGY & CAUSES

- Amebiasis
 - Caused by *Entamoeba histolytica* (anaerobic parasitic protozoan)
- Trophozoites bind to intestinal epithelial cells in colon, release lytic enzymes (e.g. cysteine proteinases) → epithelial cell lysis → trophozoites lyse inflamed/attracted immune cells → immune cell's lytic enzymes ↑ release
 - Intestinal mucosa ulcers → colitis → bowel necrosis → perforation → sepsis
 - Tissue destruction → mucosa blood vessel injury, malabsorption, ↑ intestinal secretion → bloody diarrhea, amebic dysentery
 - Blood vessel injury → trophozoites in blood stream → extraintestinal amebiasis (liver, pulmonary, cardiac, brain)

RISK FACTORS

- Endemic-area exposure (Africa, Southern Asia, Central America)
- Intimate partner transmission possible
- Youth
- Malnutrition
- Immunodeficiency (e.g. malignancy, corticosteroid treatment, HIV)
- Poor hygiene

COMPLICATIONS

- Amebic liver abscess rupture
 - Pericarditis, peritonitis
- Toxic megacolon
- Cerebral amebiasis → brain abscess → ↑ intracranial pressure
- Cutaneous amebiasis
- Dehydration

SIGNS & SYMPTOMS

- Mostly asymptomatic; bloody diarrhea, mucus in stool (severe dysentery); abdominal pain; fever; weight loss; right upper-quadrant pain, jaundice (liver); cough (pulmonary); dehydration

DIAGNOSIS

DIAGNOSTIC IMAGING

X-ray

- Liver

CT scan, MRI, ultrasound

- Cystic intrahepatic cavity detection

LAB RESULTS

Microscopic identification

- Cysts/trophozoites in stool/pus (e.g. liver abscess)

Antigen detection

- Enzyme-linked immunosorbent assay (ELISA), radioimmunoassay, immunofluorescence

PCR

- *Entamoeba* DNA detection

Serology

- *Entamoeba* antibodies detection

Sigmoidoscopy/colonoscopy

- Histological examination biopsies

TREATMENT

MEDICATIONS

- Antibacterial agents
 - Invasive amoebic colitis
- Luminal agents
 - Intraluminal cysts, trophozoites
- Metronidazole
 - Amebic liver abscess $\leq 10\text{cm}/3.94\text{in}$
- Broad-spectrum antibiotics
 - Suspected perforation, bacterial superinfection

SURGERY

- Massive GIT bleeding
- Amebic liver abscess $> 10\text{ cm}/3.94\text{ in}$
- Ruptured amebic liver abscess
- Perforated amebic colitis
- Toxic megacolon

OTHER INTERVENTIONS

- Rehydration

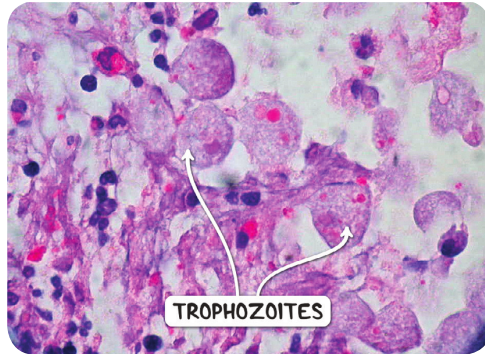


Figure 74.2 Trophozoites of *Entamoeba histolytica* in a colonic biopsy. The trophozoites have ingested red blood cells.

GIARDIA LAMBLIA

osms.it/giardia-lambliia

PATHOLOGY & CAUSES

- Giardiasis
 - Diarrheal disease caused by *Giardia intestinalis*/*Giardia duodenalis* (flagellated protozoan parasite, colonizes small intestine)
- Pathogenesis not well understood
- Infection causes microvilli shortening → intestinal malabsorption, hypersecretion → diarrhea

CAUSES

- Contaminated/untreated water ingestion
- Contaminated food (uncommon)

RISK FACTORS

- Endemic-area exposure (tropical countries), immunosuppression, comorbidities (e.g. cystic fibrosis), poor sanitation

COMPLICATIONS

- Weight loss; dehydration; zinc, disaccharidase deficiency; malabsorption syndrome (adult); growth delay (children)

SIGNS & SYMPTOMS

- Usually asymptomatic

Acute giardiasis

- 7–14 days after infection exposure
- Diarrhea, malaise, abdominal pain, flatulence, nausea/vomiting, malodorous stool, steatorrhea, fever (uncommon)

Chronic giardiasis

- > 18 days after infection exposure
- Loose stools (not typical diarrhea), profound weight loss (occasionally), abdominal pain, borborygmus (moving gas/fluid → GIT gurgling sound), flatulence, burping, malaise, fatigue, depression

DIAGNOSIS

LAB RESULTS

Antigen detection assays

- Trophozoite antigen (stool) detection

Nucleic acid amplification assays (NAAT)

- Giardia DNA detection

Stool microscopy

- Giardia cyst detection

TREATMENT

MEDICATIONS

- Antimicrobial therapy
 - Paromomycin (pregnant/lactating individuals)

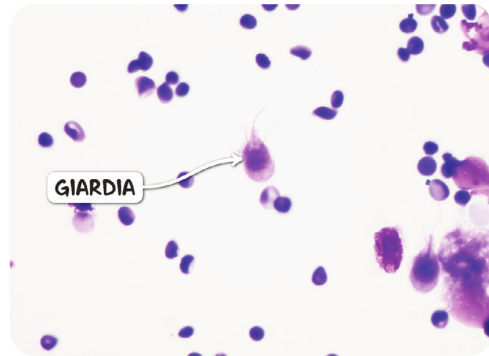


Figure 74.3 Giardia lamblia in a cytology specimen.

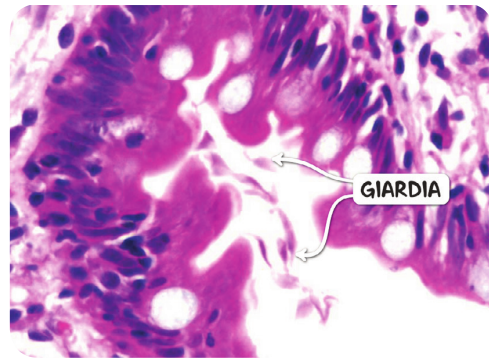


Figure 74.4 A duodenal biopsy demonstrating giardia organisms in the duodenal crypt.