Amebiasis, *Entamoeba histolytica*

Amebic dysentery; Intestinal amebiasis

Amebiasis is an infection of the intestines caused by the parasite *Entamoeba histolytica*.

**Subphylum: Sarcodina**

**Morphology and Life Cycle**: The active (trophozoite) stage exists only in the host and in fresh loose feces; cysts survive outside the host in water, in soils, and on foods, especially under moist conditions on the latter. The cysts are readily killed by heat and by freezing temperatures, and survive for only a few months outside of the host. When cysts are swallowed they cause infections by excysting (releasing the trophozoite)

- Trophozoite - metabolically active invasive stage (the pathogenic stage causing disease), moves with pseudopodia, ingests RBC, lives in colon, large intestine, caecum and is found in fresh diarrheal stool; divides by binaryfission.
  - trophozoite 10-60 - cogwheel distribution of nuclear chromatin hematophilagous.
  - unidirectional movement with pseudopodia

- Cyst - "vegetative" inactive form resistant to unfavorable environmental conditions outside human host;
  - 4 nuclei
  - this is the infective form resistant to stomach acid if swallowed
  - survives up to 30 days; excyst to trophozoite on passing through stomach
  - cyst 10-20 µm
  - chromotoidal body

The amoebae enter the body as cysts that have been ingested inadvertently by the host by eating food or drinking water containing unknown fecal contamination. The cysts are unscathed by the harsh environment of the gastric milieu. The trophozoites (eight per cyst) exit the cyst in the small bowel with assistance of chyme, proteases and pancreatic enzymes. The trophozoites inhabit the large bowel - most commonly the right side including a particular affinity for the cecum. The amoeba then must attach to the surface mucosal lining and live in harmony and with the support of already resident gut bacteria.
*Entamoeba histolytica* then invades the bowel wall destroying host tissue with the aid of special enzymes and cytotoxins that it produces. These actions result in the tissue damage that produces the ulcers and erosions seen endoscopically - the so-called "flask-shaped ulcers". While the pathologic stages of infestation show an intuitive progression from a mild, nonspecific colitis to deep ulceration with tissue necrosis, the fertile ground for finding the organisms remains the surface exudate regardless of the pathologic stage.

The trophozoites may choose not to colonize the colonic mucosa. They may instead enter the portal circulation. If they do, they can then form amebic abscesses in the liver. The trophozoites themselves are not able to transmit the disease. While the cysts have no problem with gastric acid, trophozoites cannot survive that environment. Quadrinucleate cysts are formed from the trophozoites (encystation) which then allows the disease transmission. The liver abscess is the most frequent extraintestinal manifestation of disease and patients present with fever, right upper quadrant pain, hepatomegaly, weight loss, peripheral leukocytosis and elevated liver function tests, particularly alkaline phosphatase.

**Symptoms**

The symptoms are seen 7 to 10 days after being exposed to the parasite.

**Mild symptoms:**

Patients with *E. histolytica* present with diarrhea (sometimes bloody), abdominal pain, fever, tenesmus, weight loss and others may be relatively asymptomatic.

- Abdominal cramps
- Diarrhea
  - Passage of 3 - 8 semiformed stools per day
  - Passage of soft stools with mucus and occasional blood
- Fatigue
- Excessive gas
- Rectal pain while having a bowel movement (*tenesmus*)
- Unintentional weight loss

**Severe symptoms:**
- Abdominal tenderness
- **Bloody stools**
  - Passage of liquid stools with streaks of blood
  - Passage of 10 - 20 stools per day
- Fever
- Vomiting

![Figure 2: Entamoeba histolytica](image)

Severe cases of amebiasis do exist. The organisms can produce a mass which may be mistaken for a tumor. These so-called "amebomas" can be a diagnostic challenge and may be relatively asymptomatic until obstructive symptoms occur. 6 These lesions can result in toxic megacolon and show necrosis of the bowel wall with perforations. The cecum is the most frequent site for ameboma and may be palpable on physical examination. The most dreaded presentation of intestinal amebic colitis is a fulminant necrotizing colitis that carries a 50% death rate. Necrotizing colitis most commonly occurs in children, pregnant women and/or patients on corticosteroids.

**Complications**

- Liver abscess
- Medication side effects, including nausea
- Spread of the parasite through the blood to the liver, lungs, brain, or other organs
Risk factors for severe amebiasis include:

- Alcoholism
- Cancer
- Malnutrition
- Older or younger age
- Pregnancy
- Recent travel to a tropical region
- Use of corticosteroid medication to suppress the immune system

Diagnosis

Tests include:

- Blood test for amebiasis
- Examination of the inside of the lower large bowel (sigmoidoscopy)
- Microscope examination of stool samples, usually several days apart

It can be diagnosed by stool samples, but it is important to note that certain other species are impossible to distinguish by microscopy alone. Trophozoites may be seen in a fresh fecal smear and cysts in an ordinary stool sample. ELISA or RIA can also be used.

Most common is Direct Fecal Smear (DFS) and staining (but does not allow identification to species level); Enzyme immunoassay (EIA); Indirect Hemagglutination (IHA); Antigen detection – monoclonal antibody; PCR for species identification. Sometimes only the use of a fixative (formalin) is effective in detecting cysts. Culture: From faecal samples - Robinson's medium, Jones' medium.

Treatment

Treatment depends on the severity of infection. Usually, metronidazole is given by mouth for 10 days.

If there are vomiting, it may need to receive medications through a vein (intravenously) until tolerate them by mouth.

Antidiarrheal medications are usually not prescribed because they can make the condition worse.
After treatment, the stool should be rechecked to make sure that the infection has been cleared.

**Prevention**

When traveling in tropical countries where poor sanitation exists drink purified or boiled water and do not eat uncooked vegetables or unpeeled fruit. Public health measures include water purification, water chlorination, and sewage treatment programs.

Safer sex measures, such as the use of condoms and dental dams for oral or anal contact, may help prevent infection.