

INTRODUCTION & ENTAMOEBA TO GIARDIA

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8:00-8:50 AM - Tuesday, September 4, 2007

LEARNING OBJECTIVES

INTRODUCTION

1. Understand the global significance of parasitic diseases
2. Know the criteria for study of parasites and parasitic diseases: names; morphology; location in human host; how acquired (direct acquisition and vector borne); signs and symptoms; geographic distribution and risk factors; how diagnosis is made
3. Understand the concepts of different host types, especially vector, reservoir host and transport host

ORGANISMS & DISEASE

1. Understand the route of transmission by cysts
2. Know standard and specific methods of diagnosis for *Entamoeba* and *Giardia*
3. Understand how *Entamoeba histolytica* is distinguished from commensal non-pathogenic amoebae
4. Be aware of invasive disease for *Entamoeba*

Required Reading from Murray 4th Edition

<i>Entamoeba</i>	698-701
<i>Giardia</i>	701-703

Entamoeba histolytica, Amebic Dysentery

Required Reading: *Entamoeba* 698-701

Infection with *Entamoeba histolytica* results from ingestion of the cyst form of the parasite. Cysts are a non-dividing transmission stage and are resistant to water and desiccation. Cysts 'hatch' into the dividing trophozoite form in the small intestine and colonize the large intestine. Intestinal infection is characterized by a spectrum of disease, from no symptoms, through mild diarrhea to dysentery (mucous bloody diarrhea).

Epidemiology: Worldwide distribution (10% prevalence). High risk is associated with areas of poor sanitation. In the US most isolates are *Entamoeba dispar* - about 1-2% of population.

Transmission: Fecal-Oral route, mostly via water and soil contaminated with untreated feces.

Diagnosis: Intestinal disease suggested by presence of abdominal pain, cramps, colitis, and diarrhea or dysentery in combination with travel history. Fevers, chills, and tenderness/enlargement of the liver are indicative of invasive disease.

O&P test to detect cysts and trophozoites in feces for intestinal (non-invasive) disease – also distinguish from commensal amoebae. Serology, rectal or liver biopsy, and hepatic imaging for invasive disease. PCR assays to distinguish *Entamoeba histolytica* from *Entamoeba dispar*.

Complications: Colonic ulcers (flask-shaped – ameboma), liver abscesses (in lower right lobe) and brain abscesses are consequences of invasive disease.

Prevention: Cysts can be inactivated by boiling, filtering and chemical treatment of water.

Treatment: Metronidazole is first choice.

Giardia lamblia (duodenalis), Giardiasis

Required Reading: *Giardia* 701-703

Giardiasis is acquired by ingestion of cyst, which “hatches” in and colonizes the small intestine.

Epidemiology: Worldwide distribution. In the US, high risk is associated with travel to areas of poor sanitation. In California, there is increased incidence in infants at day-care centers, men who have high-risk sex with men, and campers who drink untreated Sierra stream water. Incubation period is 1-4 weeks.

Transmission: Fecal-Oral route, via water contaminated with feces.

Diagnosis: Based on spectrum of symptoms including mild-to-severe diarrhea, abdominal discomfort, flatulence, to malabsorption syndrome.

O&P test for cysts and trophozoites (that are very fragile). String Test to sample trophozoites in duodenum in cases of difficult diagnosis.

Complications: Intestinal malabsorption and lactose intolerance in some individuals. Causes “failure to thrive” syndrome in infants.

Prevention: Cysts can be inactivated by boiling, filtering and chemical treatment of water.

Treatment: Metronidazole

Free-living Amebae, *Naegleria fowleri*

Cause Primary Amebic Meningoencephalitis (PAM) characterized by changes in olfactory perception (taste and smell), nausea, vomiting, fever, headache, with rapid onset of coma and death.

Epidemiology: Worldwide distribution. Cysts, trophozoites and flagellated forms found naturally in fresh water at 25-35 °C (hot springs). Also found in hot tubs, etc.

Transmission: Trophozoite/flagellate forms enter through olfactory epithelium (diving into hot springs).

Diagnosis: Trophozoites and flagellate forms found in CSF.

Treatment: Amphotericin B, new antibody based treatment under development

Also consider: *Acanthamoeba* spp.

- enter lower respiratory system or broken skin and cause Granulomatous Amebic Encephalitis (GAE)
- trapped behind Contact Lenses can cause ocular keratitis

Other parasites not covered:

Microsporidia: 709-710; actually a fungus - commonly associated with diarrhea in AIDS, e.g. *Enterocytozoon bieneusi*, *Encephalitozoon intestinalis*