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PROTOZOAL INFECTIONS

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DEFINITION

Protozoa are one-celled animals found worldwide in most habitats. Most species are free living, but all higher animals are infected with one or more species of protozoa. Infections range from asymptomatic to life threatening, depending on the species and strain of the parasite and the resistance of the host.

Protozoa are microscopic unicellular eukaryotes that have a relatively complex internal structure and carry out complex metabolic activities. Some protozoa have structures for propulsion or other types of movement.

Life Cycle Stages

The stages of parasitic protozoa that actively feed and multiply are frequently called trophozoites; in some protozoa, other terms are used for these stages. Cysts are stages with a protective membrane or thickened wall. Protozoan cysts that must survive outside the host usually have more resistant walls than cysts that form in tissues.

Reproduction

Binary fission, the most common form of reproduction, is asexual; multiple asexual division occurs in some forms. Both sexual and asexual reproduction occur in the Apicomplexa.

Nutrition

All parasitic protozoa require preformed organic substances—that is, nutrition is holozoic as in higher animals.

Classification

On the basis of light and electron microscopic morphology, the protozoa are currently classified into six phyla. Most species causing human disease are members of the phyla Sacromastigophora and Apicomplexa.

INTESTINAL PROTOZOA

- Amoeba: Entamoeba histalytica
- Flagellates: Giardia lamblia& trichomonas parvum/ hominis
- ciliates: balantidum coli
- sporozoa:
- isospora belli
- cyclospora cayetanensis
- cryptosporidium parvum/ hominis
- sarcocystis hominis

ENTAMOEBA HISTALYTICA – AMOEBIASIS

- world wide distribution – 3rd after malaria and schistosomiasis
- hand- mouth; fecal- oral; sexual transmission
- increasing in homosexuals
- resistant to chlorine
- major complications: amoebic abscesses in brain, liver, lung

clinical classification of amoebiasis:

- asymptomatic infection – colonization without invasion
- symptomatic infection – invasion with mild symptoms
- intestinal disease – dysentery, colitis, amoeba
- extraintestinal amoebiasis – liver, skin, lung, pleura, brain.

Pathogenesis of amoebiasis:

➢ingested cysts--- trophozoites in large intestine --- 75% remain in lumen--- 15% invasive disease; adherence/ digestion of epithelium; formation of flask shaped ulcers --- bacterial superinfection may occur --- dissemination --- liver abscess --- rupture--- pericardial disease.

Clinical presentation of amoebiasis:

❖asymptomatic
❖mild GI discomfort
❖diarrhea, pain, blood, mucus
❖weight loss
❖organ specific symptoms
❖Dx: history, cysts/ trophozoites ELISA/ PCR

Intestinal flagellates

- ❑Giardia lamblia
- ❑Giardia intestinalis
- ❑Giardia duodenalis
- ❑Trichomonas hominis

Edidemiology: world wide

- ➢Traveler's/ backpacker's diarrhea:
- ➢Day care centres
- ➢Zoonotic; water, food (fecal – oral)

Life cycle of Giardia

❖Ingestion of cysts--- trophozoites attach to duodenal brush border causing irritation and obstruction of absorption --- cysts in colon; passes in feces

Clinical presentation of giardia:

Watery diarrhea, abdominal cramps

Weight loss

No blood, no pus, no fever

Steatorrhea- fatty and foul smelling

Lactose intolerance

Antibody deficiency

ORAL FLAGELLATE--- Trichomonas tenax

INTESTINAL CILIATE

Balantidum coli – balantidiasis

- The only ciliated protozoa
- Common parasite of animals
- No extra intestinal spread
- Easily treated, not very common
- Seen in people who are around all the time
- Tx: tetracycline

INTESTINAL SPOROZOA:

- Isospora belli
- Cyclospora cayetanesis water or produce
- Cryptosporidium parvum/ hominis water and food
- Non inflammatory diarrhea
- Infection by ingestion of oocyst --- infection of intestinal epithelium
- Sexual & asexual stages - sprogony/ schizogony
- Self – limiting in immunocompetent; severe in AIDS or other immunocompromised individuals
- Dx: acid- fast oocysts in stool & history

HAEMOFLAGELLATES:

Trypanosoma& leishmania

- Insect borne
- Found in blood, tissue, lymph and CSF
- Amastigote and trypomastigote most important forms

TRYPANOSOMIASIS

- T. gambiense
- T. Rhodesiense
- T. Cruzi

LEISHMANIASIS:

Vector- Phlebotomine sand fly

3 forms

- Leishmania tropica
- Leishmania brasiliensis
- Leishmania donovanii

Drug: Sodium stibogluconate

TISSUE SPOROZOA

- Plasmodium
- Babesia
- Toxoplasma gondii
- Two life cycles, two hosts: sexual (sporogony) – definitive host; asexual (schizogony) – intermediate host

PLASMODIUM (malaria)

The plasmodium is having four types. Those are mainly

- P. falciparum
- P. ovale
- P. vivax
- P. malariae

Complications of malaria

- ✓Fibrin thrombi
- ✓Encephalopathy
- ✓Macro hyperplasia
- ✓Hepato splenomegaly
- ✓Nephrosis

Pathology of malaria

- Fever, anaemia, jaundice
- Hepato splenomegaly, hepatorenal syndrome
- Pulmonary edema, CHF
- Black water fever – dark urine
- Encephalopathy – cerebral malaria
- Protection against malaria
- Absence of receptor
- G6PD deficiency
- HbS
- Thal

Malaria hypnozonites:

- P. vivax & p. ovale
- Use primaquin against hypnozoites
- Chloroquine against severe malaria
- Quinine in severe parasitemia and resistant malaria
- Metronidazole for amoebic liver abscesses
    - Also for giardiasis, trichomoniasis, dracunculis medinensis


Thank You!