

AL-MA'MOON UNIVERSITY COLLEGE

DEPARTMENT OF MEDICAL LABORATORY TECHNOLOGY

MEDICAL PARASITOLOGY

((LECTURE 3))

FOR SECOND YEAR

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2024-2025

Lecture Three

Extraintestinal amoebiasis

Diagnosed by the use of scanning procedures for liver and other organs. Specific serologic tests, together with microscopic examination of the abscess material, can confirm the diagnosis.

Other Amebae inhabiting the Alimentary canal (non pathogen)

Most of these amoebae are commensal organisms that can parasitize the human gastrointestinal tract.

Entamoeba hartmanni in all of its life-cycle stage, *E. hartmanni* resembles *E. histolytica* except in size, yet there is a slight overlap in the size range. The trophozoites do not ingest red blood cells and their motility is generally less vigorous *E. histolytica*. As in other amoebae, infection is acquired by ingestion of food or water contaminated with cyst-bearing faeces. Identification is based on examination of small amoebae in unstained or iodine-stained preparations. Usually no treatment is indicated, measures generally effective against faecal-borne infections will control this amoebic infection.

Entamoeba coli the life cycle stages include; trophozoite, precyst, cyst, metacyst, and metacystic trophozoite. Typically the movements of trophozoites are sluggish, with broad short pseudopodia and little locomotion, but at a focus the living specimen cannot be distinguished from the active trophozoite of *E. histolytica*. However, the cysts are remarkably variable in size. *Entamoeba coli* is transmitted in its viable cystic stage through faecal contamination. *E. coli* as a lumen parasite is non-pathogenic and produces no symptoms. The mature cyst (**with more than four nuclei**) is the distinctive stage to differentiate *E. coli* from the pathogenic *E. histolytica*. Specific treatment is not indicated since this amoeba is non-pathogenic. The presence of *E. coli* in stool specimen is evidence for faecal contamination. Prevention depends on better personal hygiene and sanitary disposal of human excreta.

Entamoeba polecki- a relatively cosmopolitan parasite of hog and monkey. It can cause human disease but is rarely isolated. The disease is manifested as mild, transient diarrhoea. The diagnosis of *E. polecki* infection is confirmed by the microscopic detection of cysts in stool specimens. Treatment is the same as for *E. histolytica* infection. Prevention is achieved by good personal hygiene.

Endolimax nana is a lumen dweller in the large intestine, primarily at the cecal level, where it feeds on bacteria. The life cycle is similar to *E. histolytica*. Motility is typically sluggish (slug-like) with blunt hyaline pseudopodia, Projects shortly. Human infection results from ingestion of viable cysts in polluted water or contaminated food. Typical ovoid cysts of *E. nana* are confirmative. Rounded

cysts and living trophozoites are often confused with *E.hartmanni* and *E.histolytica*. No treatment is indicated for this non- pathogenic infection. Prevention can be achieved through personal cleanliness and community sanitation.

Iodamoeba buetschlii: - the natural habitat is the lumen of the large intestine, the principal site probably being the caecum. The trophozoite feeds on enteric bacteria; it is a natural parasite of man and lower primates. It is generally regarded as a non-pathogenic lumen parasite. No treatment is ordinarily indicated. Prevention is based on good personal hygiene and sanitation in the community.

Entamoeba gingivalis - only the trophozoite stage presents, and encystation probably does not occur. *E gingivalis* is a commensal, living primarily on exudate from the margins of the gums, and thrives best on unhealthy gums. No specific treatment is indicated. However the presence of *E. gingivalis* suggests a need for better oral hygiene. The infection can be prevented by proper care of the teeth and gums.

Entamoeba dispar is morphologically indistinguishable (both cyst and trophozoite) from *E. histolytica*, so it may be considered as a subspecies of *E. histolytica*. It can be distinguished from *E. histolytica* by: Zymodeme study (hexokinase isoenzyme pattern), molecular methods, PCR amplifying, detection of lectin antigen in stool, and RBC inside trophozoites-present only in *E. histolytica*. *E. dispar* parasite is nonpathogenic, usually colonizes in the large intestine (10 times more than *E. histolytica*) but doesn't invade intestinal mucosa. It grows well in polyxenic media, however, poorly grows on axenic media. *E. dispar* doesn't induce antibody production. The life cycle is essentially identical to that of *Entamoeba coli* or any of the other nonpathogenic intestinal protozoa, and the cyst form is the infective form for humans.

Entamoeba moshkovskii is also morphologically indistinguishable from *E. histolytica* and *E. dispar* (may be the third subspecies of *E. histolytica*). This species was first described from Moscow sewage by Tshalalaia in 1941 and was thereafter reported to occur in many different countries including India. It can be distinguished from *E. histolytica* by isoenzyme analysis, molecular methods, and detection of lectin antigen. Though it is a non-pathogen harboring in the intestine recent studies from Bangladesh and India have reported *E. moshkovskii* as a sole potential pathogen in patients presenting with gastrointestinal symptoms and/or dysentery, highlighting the need for further study to investigate the pathogenic potential of this organism. *E. moshkovskii* is found worldwide and is generally

considered to be a free-living amoeba. Based on microscopic morphology, this organism is indistinguishable from *E. histolytica* and *E. dispar*, except in cases of invasive disease when *E. histolytica* contains ingested RBCs. Although first isolated from sewage, *E. moshkovskii* can also be found in clean riverine sediments to brackish coastal pools.

PATHOGENIC FREE-LIVING AMOEBAE

Among the numerous free-living amoebae of soil and water habitats, certain species of *Naegleria*, *Acanthamoeba* and *Balamuthia* are facultative parasites of man. Most human infections of these amoebae are acquired by exposure to contaminated water while swimming. Inhalation of cysts from dust may account for some infections.

Naegleria fowleri- the trophozoites occur in two forms. Amoeboid forms with single pseudopodia and flagella forms with two flagella which usually appear a few hours after flooding water or in CSF.

***Acanthamoeba* species**- the trophozoites have an irregular appearance with spine-like pseudopodia, and acanthopodia.

Balamuthia* species**- the trophozoite extends a broad, flat lamellipodia or sub pseudopodia from it. The trophozoite may be bi-nucleated. Unlike most amoebae the nuclear envelope breaks down during mitosis. *Naegleria*, *Acanthamoeba*, *Balamuthia* organisms are opportunistic pathogens. ***Naegleria fowleri causes acute primary amoebic meningoencephalitis. ***Acanthamoeba* & *Balamuthia*** organisms are responsible for granulomatous amoebic encephalitis and single or multiple brain abscesses, primarily in immunocompromised individuals. Keratitis (eye) and skin/infection by *Acanthamoeba* may also occur. For the diagnosis of *Naegleria*, *Acanthamoeba*, and *Balamuthia* infections, specimens of nasal discharge and cerebrospinal fluid; and in cases of eye infections corneal scraping should be collected. The clinical specimen can be examined with saline wet- preparation and iodine stained smear. Treatment of free-living amoebic infections is largely ineffective. These infections are rare in Ethiopia.