



INTESTINAL PROTOZOA



PARASITIC INFECTION OF GIT



Protozoa

Unicellular → single cells for all functions

Amoebae: move by pseudopodia

Flagellates: move by flagella

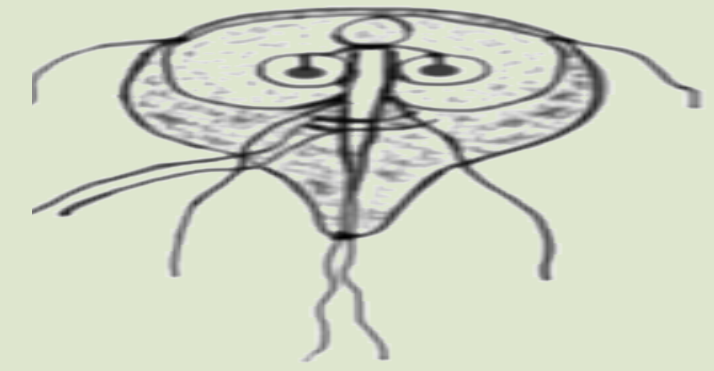
Ciliates: move by cilia

Apicomplexa (sporozoa): tissue parasite



Giardia Lamblia

(2 stages)



Cyst Stage

- **Infective stage**
- Multinucleated
- Can survive outside the host and stay infectious in the environment for more than 3 months
- **Can resist stomach acidity**

Trophozoite Stage

- **Replicative stage**
- 2 nuclei & adhesive disc
- 8 flagella
- Can't survive outside the host

Life Cycle

- Transmitted via **fecal-oral** route with the ingestion of **cyst (infective stage)**
Ingestion of cyst → **excystation** of cyst (in the **small intestine**) → produce trophozoite → sexual replication of trophozoite (binary fission) → causes the disease (diarrhea, vomiting, excessive gas & loss of appetite especially in children) → encystation (in large intestine) → excreted in the feces as cyst or trophozoite.

Clinical Picture

- The parasite mostly asymptomatic
- Can produce a wide range of gastrointestinal symptoms (especially in children)

Typical picture of symptomatic infections

IP 1-2 weeks, followed by diarrhea, vomiting & **flatulence** for about 6 weeks

Atypical picture of symptomatic infections

Severe diarrhoea, malabsorption especially in children and cholecystitis.

Laboratory Diagnosis

- Stools examination:
 - Microscopy for cysts or trophozoite (because both are excreted in feces)
 - Detection of Giardia antigens in stools
- Examination of duodenal biopsy: trophozoites

This is a tissue section of giardia trophozoites seen by duodenal aspirate



Treatment

- Chemotherapy
- Drug of choice: Metronidazole



Entamoeba Histolytica

- ★ 500 million people are infected. 100,000 deaths per year. Worldwide distribution
- ★ It is seen more often in **tropical countries** with poor sanitary conditions.
- ★ It is a **waterborne** infection.

There are 6 species of *Entamoeba*:

- ★ *E.histolytica* → pathogenic & invasive
 - ★ *E.dispar* → nonpathogenic & non invasive
 - ★ *E.hartmanni*
 - ★ *E.coli*
 - ★ *E.gingivalis*
 - ★ *E.polecki*
- } can't be distinguish by microscopic observation.

Cyst Stage	Trophozoite Stage
<ul style="list-style-type: none"> - Infective stage. - Diagnostic stage - Resist the harsh conditions of the environment. 	<ul style="list-style-type: none"> - Vegetative (pathologic) stage - Diagnostic stage - Must encyst to survive in the environment. - It is a fragile structure.

Mode of Infection	<ul style="list-style-type: none"> - Faecal-oral route (water & food) - Flies can act as vector - Can be sexually transmitted person to person contacts (homosexuals) - Not a zoonosis - The infective dose can be as little as 1 cyst. (highly virulent) - The incubation period can be from few days to few weeks depending on the infective dose. - If the trophozoite is ingested it is disintegrates in the stomach without producing infection.
Life Cycle	<ul style="list-style-type: none"> - Excystation occurs in the lower region of the small intestine and then production of 8 small amoebae which enter the large intestine and may : <ol style="list-style-type: none"> 1. Invade the tissue 2. Live in the lumen of large intestine without invasion 3. Encyst (become acysts and pass in the stool) - Only the Cysts can survive in the environment for weeks at appropriate temperature and humidity after excreted from stool of infected patients.



Intestinal Amoebiasis (Acute Amoebic Dysentery)

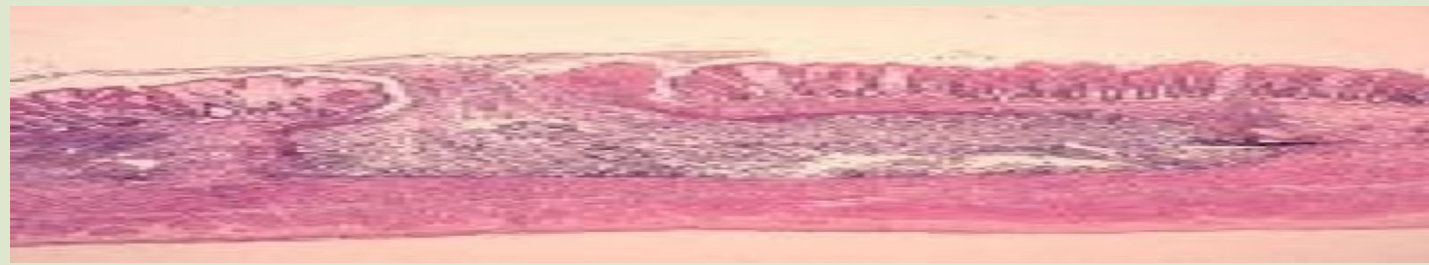
- ★ Trophozoite has the ability to hydrolyze host tissues with their active enzymes present on the surface membrane of the trophozoite.
- ★ Trophozoite has the ability to ingest blood cells → anemia
- ★ **The presenting symptom is diarrhoea which is accompanied by blood ,mucus and sometimes tenesmus.**
- ★ As a complication ,severe intestinal hemorrhage or rarely perforation may occur lesions are found in cecum ,appendix or colon.
- ★ They may heal. If perforation of the colon occurs, this may lead to peritonitis that can lead to death.
- ★ Ameboma :Granulomatous mass obstructing the bowel.

Complications

- Intestinal perforation



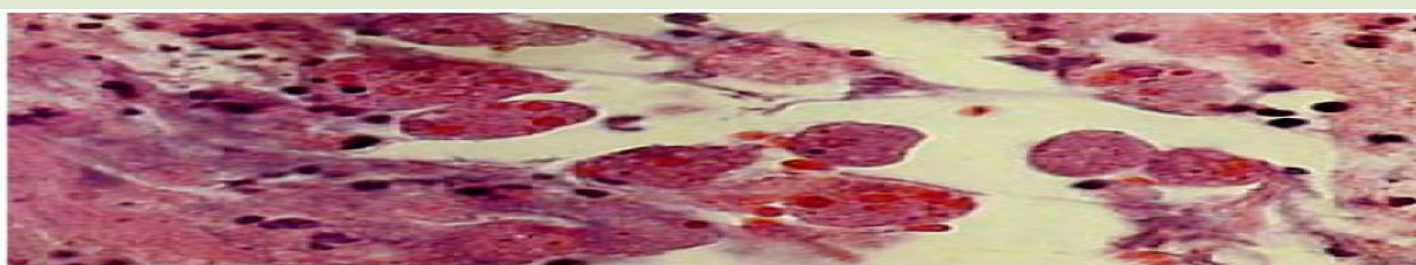
- **Flasked shaped ulcer in large intestine**



- Ameboma
- Invasion of blood vessels
- Amoebic liver, lung, or brain **abscess**
- Direct extension outside bowl

E. Histolytic in mucosa:

- Numerous trophozoites can be seen with ingested erythrocytes

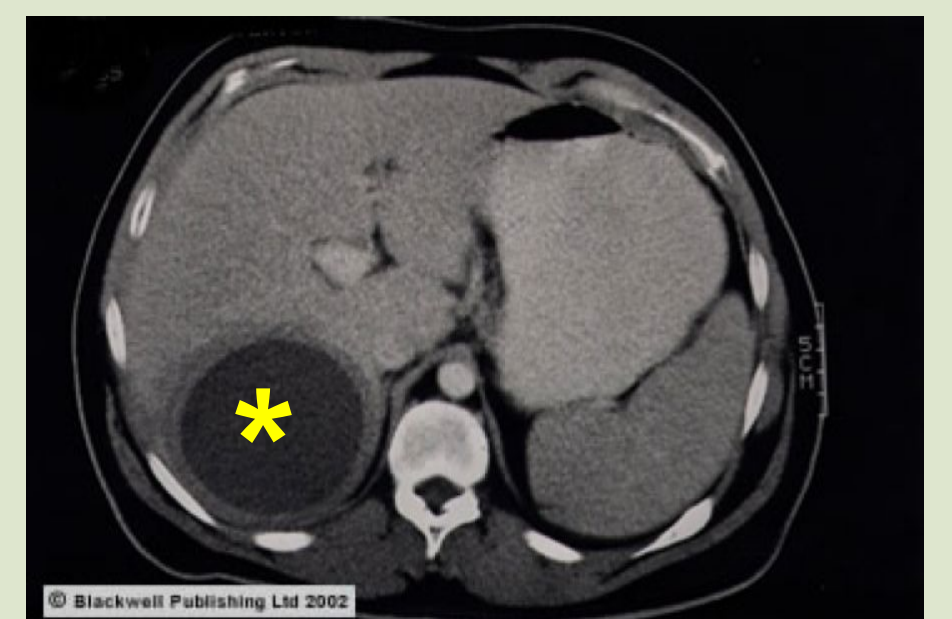


Extra-Intestinal Amoebiasis

- The trophozoite will perforate the blood and go to to the brain lungs or liver. **(mostly the liver)**

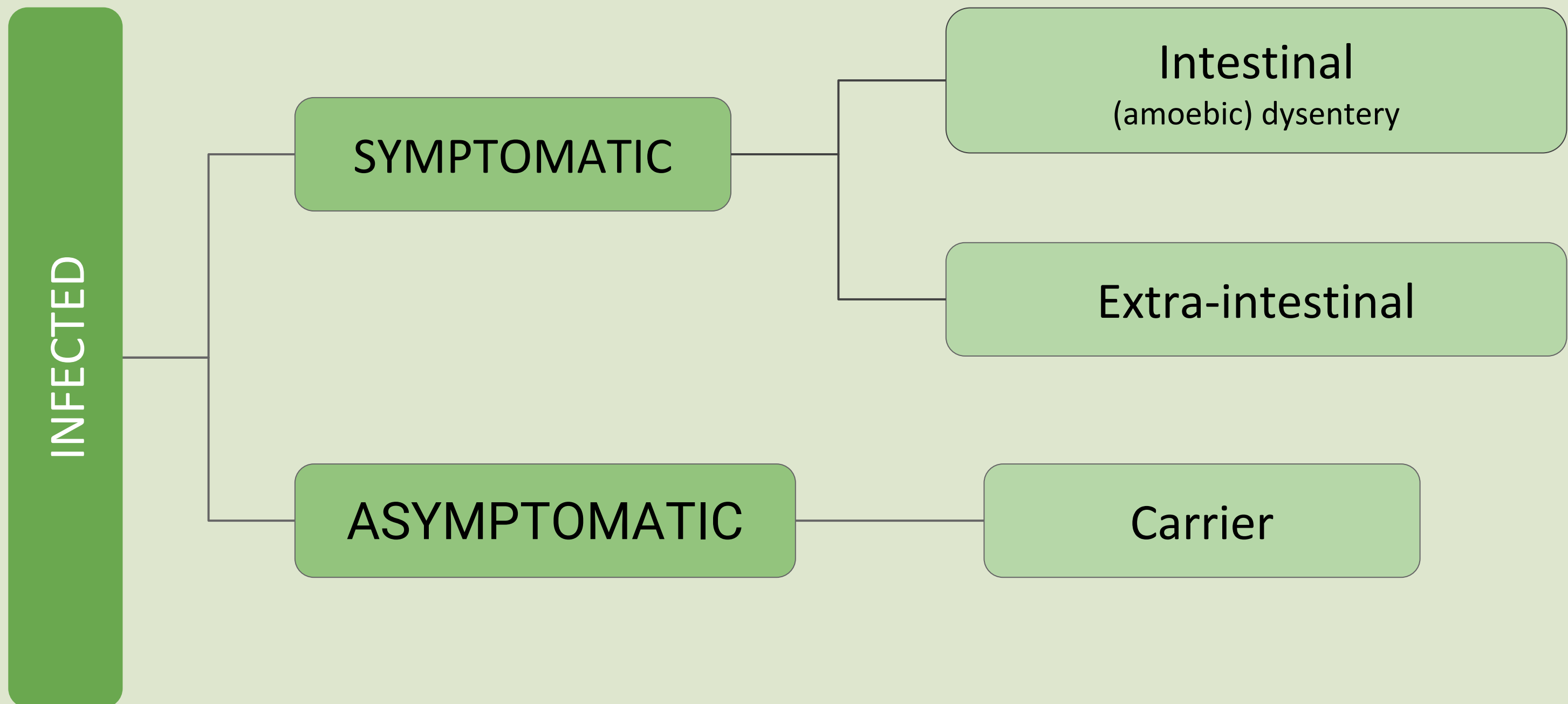
The doctor said an OSPE case might be similar to this one:

30-year-old male experienced diarrhea for two weeks with fever of 39° C, nausea, vomiting, malaise and right upper abdominal pain. Physical examination revealed hepatomegaly 6 cm below the right costal margin. CT scan showed a single hypodense mass* in the right lobe of 7.8 x 5.2 cm, round, with well defined borders. **Serology** was positive for Entamoeba histolytica at 1/512. Amebic liver abscess was diagnosed.



Entamoeba Histolytica

The clinical outcomes:



	Treatment	Laboratory Diagnosis
Intestinal	<ol style="list-style-type: none"> Asymptomatic (cysts only): <ul style="list-style-type: none"> Diloxanide furoate (Furamide) Symptomatic (cysts and trophozoites) <ul style="list-style-type: none"> Metronidazole 	<ol style="list-style-type: none"> Stools examination : <ul style="list-style-type: none"> Wet mount (cysts and trophozoites) Concentration methods (only cysts) Serology (mainly for invasive infections): IHA , ELISA
Extra-intestinal	<ul style="list-style-type: none"> Metronidazole 	<ul style="list-style-type: none"> Serology: IHA , ELISA Microscopy of tissues or fluids Radiology



Cryptosporidium Parvum

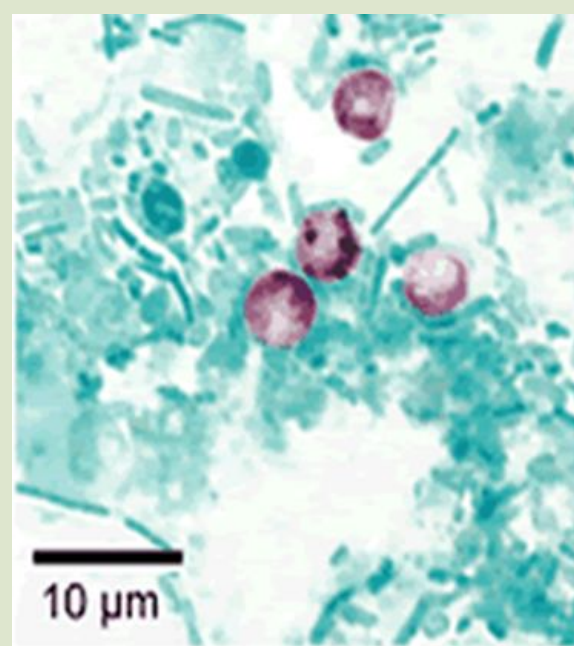
General Info

- Infection is caused by ingestion of **sporulated oocysts** transmitted by the **faecal-oral route**
- Infection is generally self-limiting in immunocompetent people.
- **In immunocompromised patients, such as those with AIDS** or those undergoing immunosuppressive therapy, infection may not be self-limiting, leading to **dehydration and, in severe cases, death.**

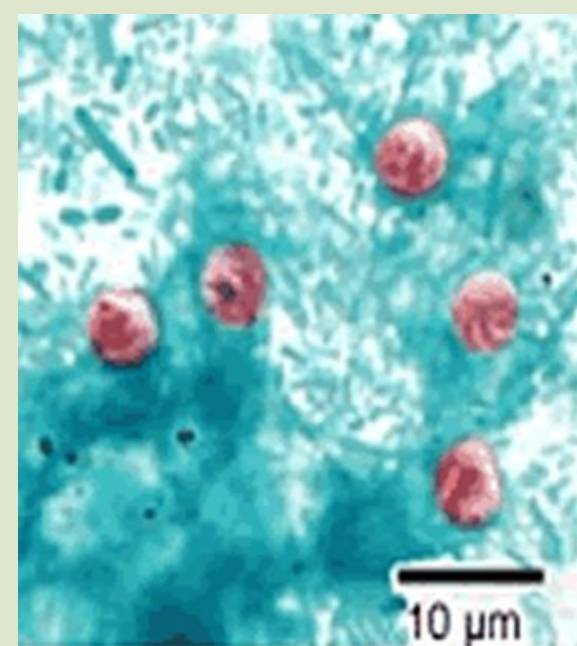
Treatment & Prevention

- The most effective way to prevent the spread of *C. parvum* is to avoid contact with contaminated feces. Avoiding this contact, especially with young children. Hygiene is the most effective way to combat this difficult-to-prevent parasite
- Self-limited in immunocompetent patients
- In AIDS patients: **paromomycin**

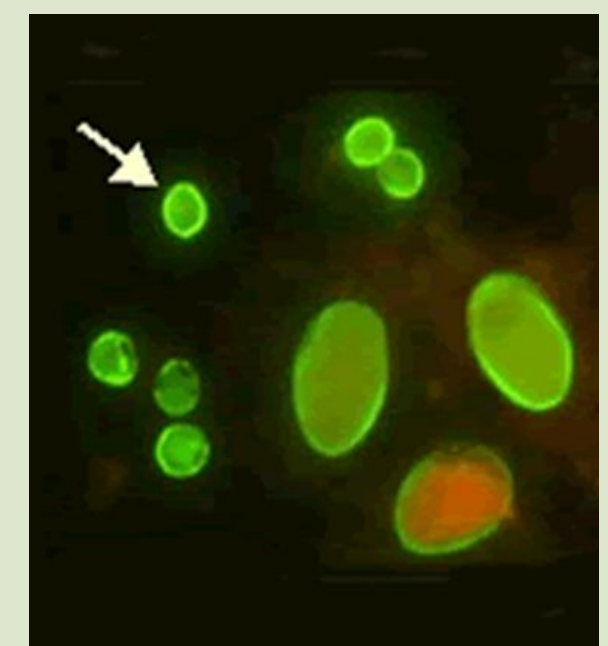
Diagnosis



Cryptosporidium oocysts in feces by acid-fast stain

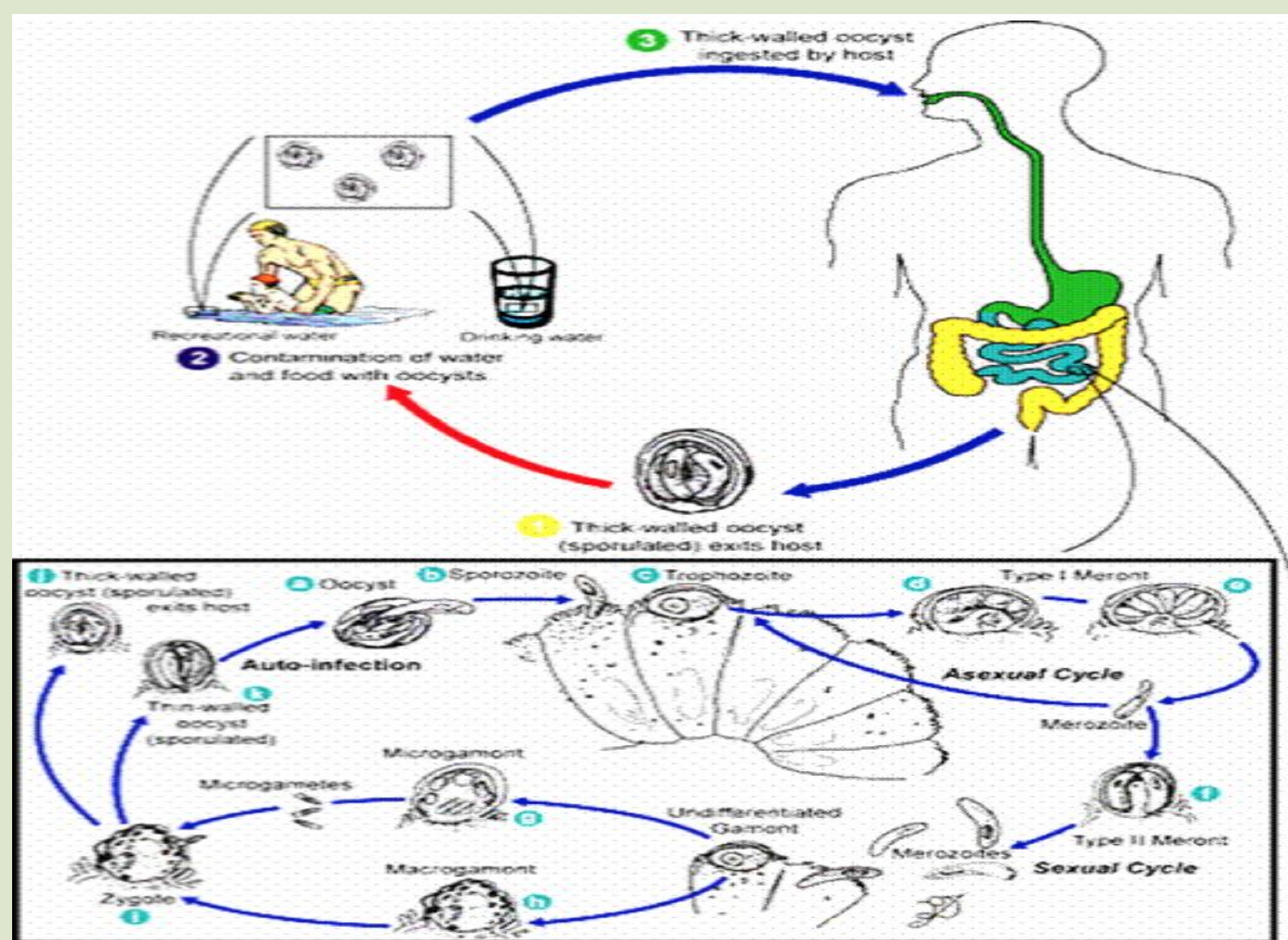


Cryptosporidium, safranin ziehl-neelsen



Crypto-Gardia FAT

Life Cycle



Dr's Notes

★ The dr said don't memorize the treatment but in case just know Metronidazole

Giardia Lamblia

- First, the gardia is wearing a coat to hide what's inside the cell (cyst) it is strong and can resist environment & gastric acidity (**infective stage**)
- Then when the cyst takes off its coat (excystation) it becomes trophozoite and causes the disease (**pathological stage**) → increase the intestinal movements which will result in vomiting, diarrhea loss of weight and appetite.
- **Both cyst and trophozoite are diagnostic stage**
- Digestion of trophozoite won't cause infection since it will die bc of the acidity
- It likes the small intestine more (so excystation happens here)
- **Non invasive**
- **Can be asymptomatic**

Entamoeba Histolytica

- E.histolytica is the only pathogenic amoebae
- It likes the large intestine (excystation happens here)
- **Invasive**
- **Can cause severe symptoms (bloody diarrhea with tenesmus)**
- **Highly virulent (one cyst can cause infection)**
- When it enters the large intestine 3 things might happen
 1. Invade the tissue → ulcer (intra-intestinal)
 2. Stay in the lumen → mild symptoms (diarrhea)
 3. Penetration → goes to the liver or brain (extra-intestinal)

Case:

Patient complaining of bloody diarrhea with cyst coming in the stool.

- diagnosis? Acute amoebic dysentery.
- Causative agent? E. histolytica
- **The gold standard is stool examination**

In liver abscess of amoebiasis: they will mention a history of diarrhea, vomiting and discomfort while hydatid cyst will only complain of pressure from the liver (pain in the liver)

Cryptosporidium Parvum

- In immunocompromised patients; **HIV** and cancer and they will devolp severe diarrhea and loss of weight (**NOT IN IMMUNOCOMPETENT**)
- **AIDS: is the end stage of HIV infection patient**
- How to avoid it? Increase hygiene



Summary

Intestinal protozoa

Giardia Lamblia

Stages	Cyst	Trophozoite
Features	Infective stage Multinucleated	Replicative , 2 nuclei 8 flagella, Adhesive disc
Life cycle	1-Ingestion of dormant cysts. 2-Excystation 3-Asexual replication 4-Encystation 5-Trophozoite and Cyst expelled in feces. (only cyst survive outside of the host)	
Clinically	-Mostly asymptomatic can be Symptomatic Infections (especially in children):	
	Typical:	Atypical:
	IP: 1-2 w then diarrhea ,vomiting & flatulence for about 6w	Severe diarrhea, malabsorption especially in children and cholecystitis.
Laboratory diagnosis	❖ Stools examination: 1-Microscopy for cysts or trophozoites 2-Detection of Giardia antigens	Examination of duodenal biopsy: trophozoites
Treatment	Metronidazole	

Entamoeba histolytica:

Example	E.histolytica: Amoebae that are pathogenic and invasive	
stages	Cyst	Trophozoite
features	infective stage. Resist the harsh conditions.	vegetative stage, fragile structure. If ingested cannot cause infection
Transmission	faecal-oral route - sexually transmitted Flies can act as vector - Not a zoonosis	
Life cycle	When cyst is ingested - Excystation in the small intestine production of 8 small amoebae which enter the large intestine and may : (1)invade the tissue (2) asymptomatic colonization (3) encyst	
Can cause:	Intestinal amoebiasis (Acute amoebic dysentery): Trophozoite has the ability to hydrolyze host tissues with their active also has the ability to ingest blood cells. Flask shape ulcer in large intestine	Extra-intestinal
Laboratory diagnosis	Intestinal : Stools examination : Wet mount (cysts and trophozoites) Concentration methods (only cysts)	Extra-intestinal: Microscopy of tissues or fluids
	Serology: IHA , ELISA	
Treatment	Intestinal and extra-Intestinal: Metronidazole	

Cryptosporidium Parvum

Caused by	sporulated oocysts	Affect	In immunocompromised patients
Transmission	faecal-oral rout	Treatment	paromomycin

MCOs:

1- The infectious stage of giardia lamblia is?

- A- Trophozoite.
- B- Cyst.
- C- both.

2-Which of the following is sexually transmitted ?

- A- sporulated oocysts.
- B- Giardia Lamblia.
- C- E.histolytica.
- D-C.Parvum.

3- An AIDS patient came to the ER complaining of diarrhea and abdominal pain. Examination confirm the presence of parasite, which of the following is the more likely pathogen? And what is the drug of choice ?

- A- Entamoeba histolytica, Paromomycin.
- B- Cryptosporidium Parvum, Metronidazole.
- C- Entamoeba histolytica, Metronidazole.
- D-Cryptosporidium Parvum, Paromomycin.

4- Ingested erythrocytes are seen in patient with?

- A- Amoeboma.
- B- peritonitis.
- C- Amoebic dysentery.

5-When does Giardia Lamblia replicate ?

- A- Cyst stage.
- B- Trophozoite stage
- C-both.

6- Atypical symptom of giardiasis is?

- A-vomiting.
- B- malabsorption.
- C- flatulence.

SAQ:

3-D
2-C
1-B
6-B
5-B
4-C

- A 34 years old male came to the ER. He complained of diarrhea with blood, abdominal pain, fatigue and fever. Histological examination reveal the presence of Flask shaped ulcer.

1- What is the most likely pathogen?

E.histolytica

2-What is your diagnosis ?

Intestinal amoebiasis(Acute amoebic dysentery)

2- What further test would you order ?

-Stools examination :

- Wet mount
- Concentration methods

-Serology: IHA , ELISA

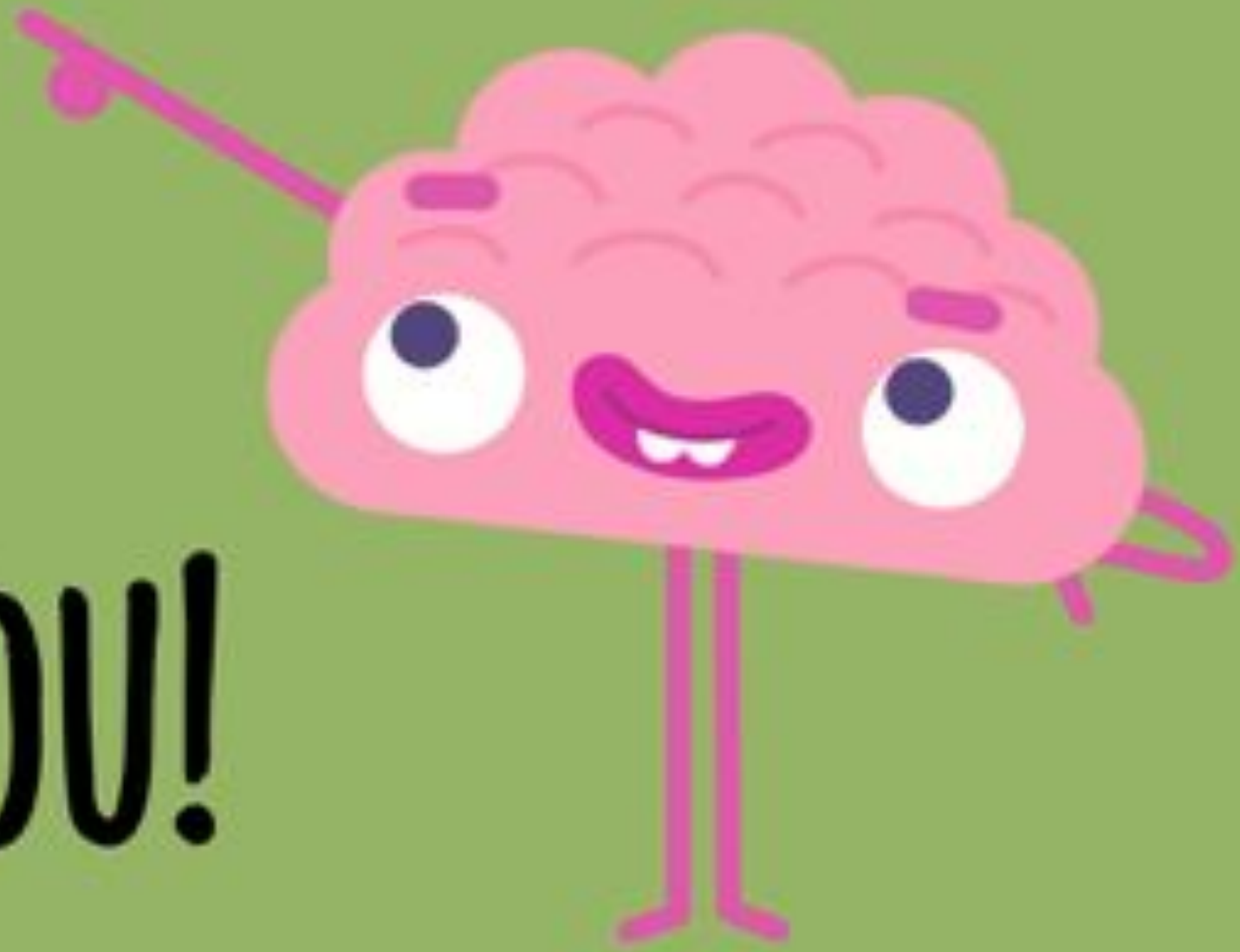
3-what is the proper way to treat him?

Metronidazole

4- What are the complication of the disease?

Severe intestinal hemorrhage or rarely perforation may occur, Amoeboma, peritonitis





THANK YOU!



TEAM LEADERS:

ALANOUD AL-MANSOUR & KHALED AL-OQEELY

TEAM MEMBERS:

ALANOUD AL-MUFARREJ
LAMEES AL-SUWAILEM
SARA AL-SUTAN

Designed by:
Aseel Badukhon (:

