Lecture 4

Intestinal Helminths

- Additional Notes
- Important
- Explanation
- Examples

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HELMINTHS

- Multicellular
- Types:

A. Round worms (**Nematodes**)

- ✓ Elongated, cylindrical, unsegmented.
- ✓ Its size < 1 -100 cm. long
- ✓ male is smaller than female
- ✓ Located: Intestinal & Tissue nematodes
- ✓ Treatment for most of the Intestinal nematodes: Albandazole , Mebendazole

B. Flat worms

- Trematodes: leaf-like, unsegmented.
- **Cestodes**:
  - ✓ tape-like, segmented.
  - ✓ Treatment:
    - Intestinal stages: Praziquantel
    - Tissue stages (Hydatid , cysticersosis):

    Depends on clinical condition : Surgical and/or Albendazole

A. Round worms (Nematodes)

1) Enterobius (Oxyuris) vermicularis

(Thread worm or Pinworm)

About this worm	Life cycle	Infective stage	Pathology	Diagnosis
▪ Common in temperate regions ▪ Children > adult ▪ Can be seen by naked eye ▪ asymptomatic ▪ Autoinfection occurs by contamination of the fingers	eggs ingested from contaminated surfaces → mature into adults in large intestine → Fertilization → at night, females migrate out of rectum to perianal skin → lay eggs ==> **perianal itchiness** → Autoinfection OR Contaminate other human	Eggs **Diagnostic stage** Eggs	✓ pruritus ani ✓ Females: in valvovaginitis, salpingitis	CELLULOSE ADHESIVE TAPE around the anus and then examine for eggs.

2) Ascaris lumbricoides (roundworm)

About this worm	Life cycle	Infective stage	Pathology	Diagnosis
▪ commonest ▪ in the small intestine, Jejunum and Upper part of ileum. ▪ Feed on semi digested food → host malnutrition	Embryonated eggs ingested from contaminated soil → hatch in small intestine → larvae invade intestinal wall → enter bloodstream and transported to lungs → enter alveoli and ascend toward trachea → swallowed again → adult in small intestine pass fertilized eggs with stool to the soil	Embryonated egg **Diagnostic stage** Fertilized egg	▪ **Adult worm** Light → Asymptomatic Heavy→ intestinal obstruction Migrating → bile duct -jaundice ▪ **Larvae** Loeffler`s syndrome (1)	✓ Eggs or adult in stool. ✓ larvae in sputum.

(1) Pneumonitis and bronchospasm, cough with bloody sputum, eosinophilia, urticaria

3) Trichuris trichiura (Whipworm)

About this worm	Life cycle	Infective stage	Pathology	Diagnosis
▪ coexists with Ascaris because of similar requirement ▪ Adult live in large intestine especially caecum and appendix	The fertilized eggs are passed with the stool→In the soil, the eggs become infective in 15 to 30 days →After ingestion (soil-contaminated hands or food), the eggs hatch in the small intestine, and release larvae →mature and establish themselves as adults in the colon→ The females begin to oviposit 60 to 70 days after infection.	Embryonated egg **Diagnostic stage** Fertilized egg	light infection → asymptomatic. heavy infection→ ✓ Abdominal pain ✓ Bloody diarrhea. ✓ Rectal prolapsed in children is a common complication.	✓ Eggs in stool. haracterized by its barrel shape with mucoid plugs at each pole (American football shape) 

4) Ancylostoma dudenale" world wide" &Necator americanus " in America" (Hook worms)

About this worm	Life cycle	Infective stage	Pathology	Diagnosis
▪ Found in **small intestine** mainly jejunum. ▪ Mouth lined with hard hooks, triangular cutting plates and **anticoagulant glands**	Filariform Larva in the soil penetrate the skin (1) → go to the circulation (lungs (2))→ larva then swallowed and go to **small intestine** → attach to the mucous membrane where they mature into adult→ female starts laying eggs to be passed in stool(not infective) in soil →Rhabiditiform larva→ Filariform Larva	Filariform Larva **Diagnostic stage** Egg	▪ **Adult worm** Low → Asymptomatic High → ✓ Epigastric pain, vomiting , hemorrhagic enteritis. ✓ hypoproteinaemia edema ▪ **Larvae** (1) Site of infection on the skin→ itching & dermatitis (2) Migration Phase → cough with bloody sputum, pneumonitis ▪ **Anemia** → sever anemia = microcytic hypochromic anemia	✓ egg in stool. ✓ Positive occult blood. 

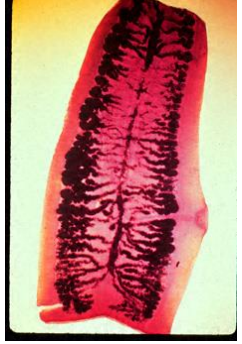
5) Strongyloides stercoralis

About this worm	Life cycle	Infective stage	Pathology	Diagnosis
▪ in tropical area. ▪ fatal dissemination in immuno-compromised host ▪ The smallest ▪ **AUTOINFECTION** Is very important criteria	▪ **Direct development:** The rhabiditiform larva pass from stool and become directly a Filariform larva if the environment of the soil is good ▪ **Indirect development** In external environment rhabiditiform larva becomes free living adults, produce eggs, rhabiditiform larva and Filariform larva ▪ **AUTOINFECTION** ✓**Internal:** when the rhabiditiform larva become a filariform larva in the intestine and penetrate the intestine ✓**External** : fecal contamination of skin rhabiditiform larva→ filariform penetrates the skin	Filariform larva **Diagnostic stage** Eggs	▪ **Cutaneous** Dermatitis in case of external autoinfection. ▪ **Migration** pneumonitis ▪ **Intestinal** diarrhea, upper abdominal pain in the epigastria ▪ Disseminated strongyloidiasis in patient with immunodeficiency(1)	✓Stool examination ✓Duodenal aspirate

(1) Uncontrolled diarrhea → granulomatous changes→ necrosis→ perforation→ peritonitis → death.

B. Cestodes : (Tapeworm)

1) Taenia saginata

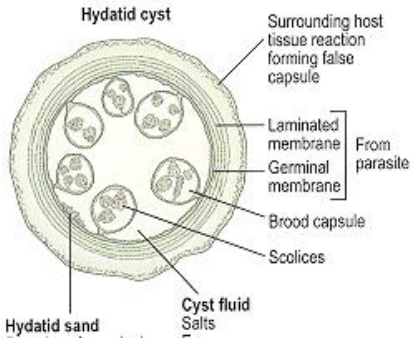


About this worm	Life cycle	Infective stage	Pathology	Diagnosis
▪ obligatory parasite of man ▪ adult worm live in the Small intestine .	1. CATTLE become infected by ingesting grass contaminated with eggs or gravid segments which passed from human faces 2. In the cattle go to circulation and transformed to cysticercus stage in the muscle known as CYSTICERCUS BOVIS. 3. Man become infected by eating undercooked beef, the adult worm lives in small intestine → passing eggs and gravid segments to the environment.	Undercooked Beef with CYSTICERCUS BOVIS **Diagnostic stage** eggs or gravid segments	✓ majority Asymptomatic ✓ malnutrition, abdominal discomfort	stool: proglottids, eggs.

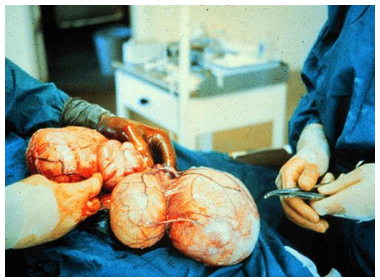
2) Taenia solium

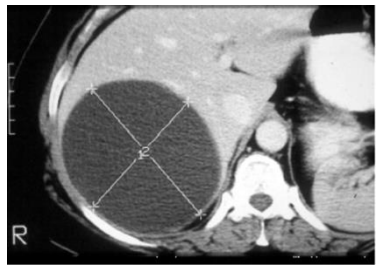
About this worm	Life cycle	Infective stage	Pathology	Diagnosis
▪ In pigs & human	Adult worm in S.I of human → pass eggs & segments with the stool → ingested by pigs → formation of Cysticercus bovis in the pigs muscle humans ingest eggs from infected feces (vs. larvae in pork) → eggs hatch into oncospheres in small intestine → oncospheres penetrate intestinal wall and travel to other tissues → form cysticerci containing larvae, especially in brain, skeletal muscle, and eye.	Undercooked beef **Diagnostic stage** eggs or gravid segments	cysts grow slowly → neurologic defects (seizures, focal symptoms) or blindness → when cysts die after several years, increased inflammation → aggravated symptoms	

3) Echinococcus granulosus



About this worm	Life cycle	Infective stage	Pathology	Diagnosis
▪ echinococcosis or hydatid cyst disease	eggs found in dog feces → humans ingest eggs → eggs hatch into larvae in small intestine → larvae penetrate intestinal wall and travel to other tissues → form hydatid cysts in liver, lung, or brain	Eggs **Diagnostic stage** Hydatid cysts	organ dysfunction: liver → enlarged cyst may also rupture	▪ Imaging ✓CT ✓MRI ▪ Microscopy: Hyadtid sand ▪ Serologic tests to detect specific antibodies





Quiz

1. A 6-year-old boy, came to the GP to complete his school screening. GP found weird perianal, white areas. From history the boy has not had any pain or diarrhea or other symptoms except itching. Which technique should the doctor use to collect the biopsy and conform his hypothesis?

a) stool sample & egg presence will confirm his diagnosis

b) blood, and +ve occult test c) scotch tape and examination for the egg

2. Loeffler's syndrome is associated with which of the following organisms?

a. strongyloiodes srecoradis c. ascaris lumbericoides
b. oxyuris d. ancylostoma duodenale & necator americanus

ANSWERS: 1.C 2.C

Quiz

ANSWERS: 3.D 4.A

3. Anemia could be a complication for which of the following infections?

a. Strongyloiodes srecoradis
b. Ascaris lumbericoides
c. Oxyuris
d. Ancylostoma duodenale & necator americanus

4. Two drugs used in almost all the nematodes GIT infection:

a. Albendazole & Mebendazole
b. Oxoplasma & Albendazole
c. Albendazole & Cryptosporidium
d. Zithromax & Cryptosporidium