Common Helminthic infections of the GI tract

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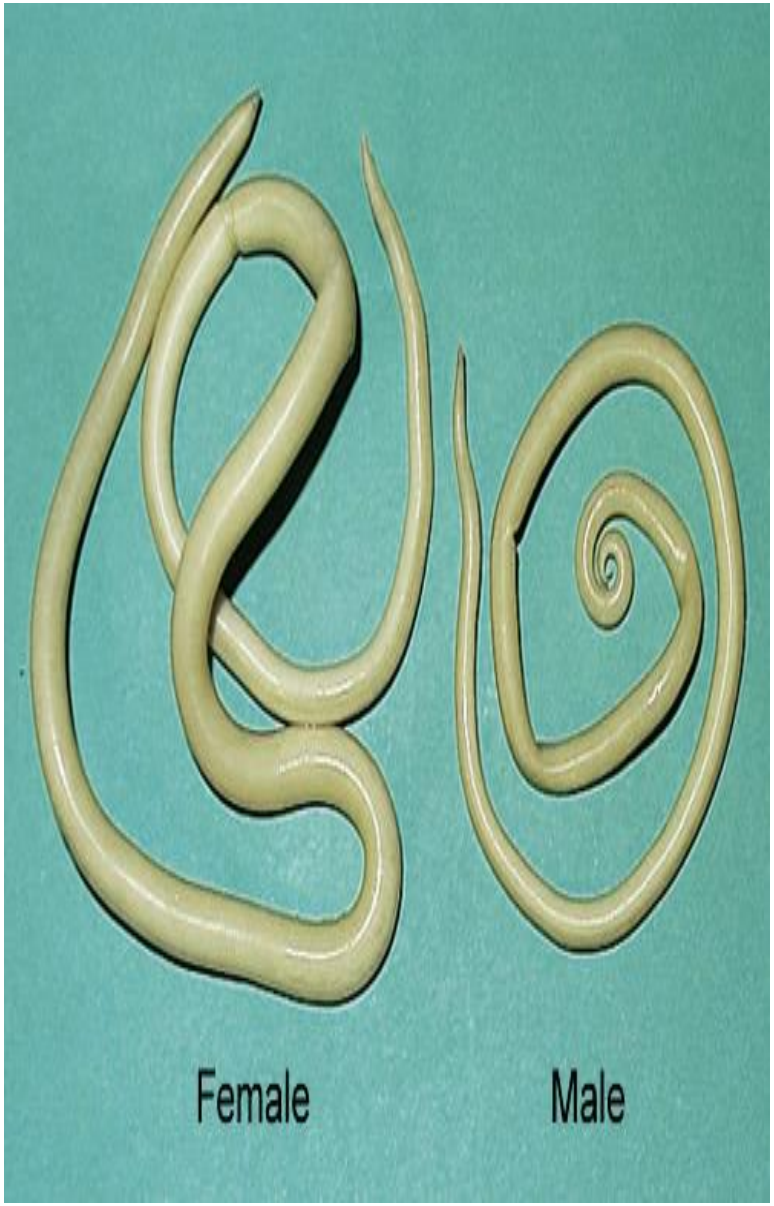
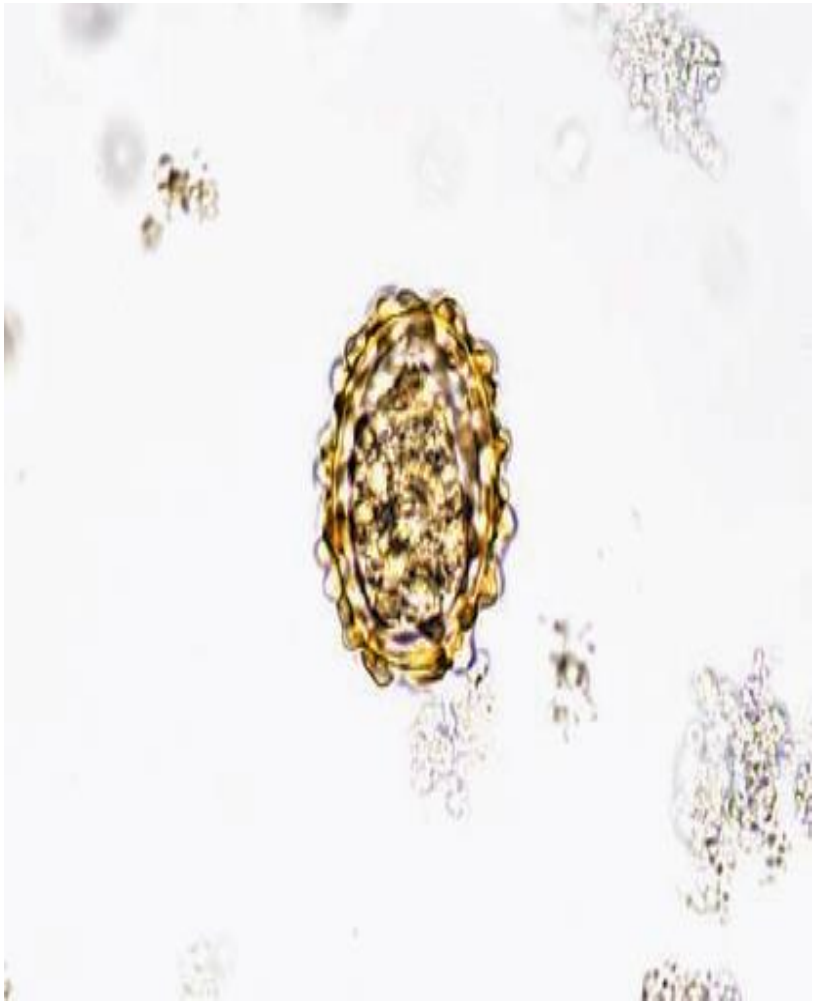
ASCARIS LUMBRICOIDES

Morphology :

- Male adult worm measures 15-20 cm in length
- Female adult worm measures 20-40 cm in length
- The posterior end of male adult worm is curved while the female adult worm is straight
- Estimated prevalence more than 1 billion .


Female
Male



Mode of transmission

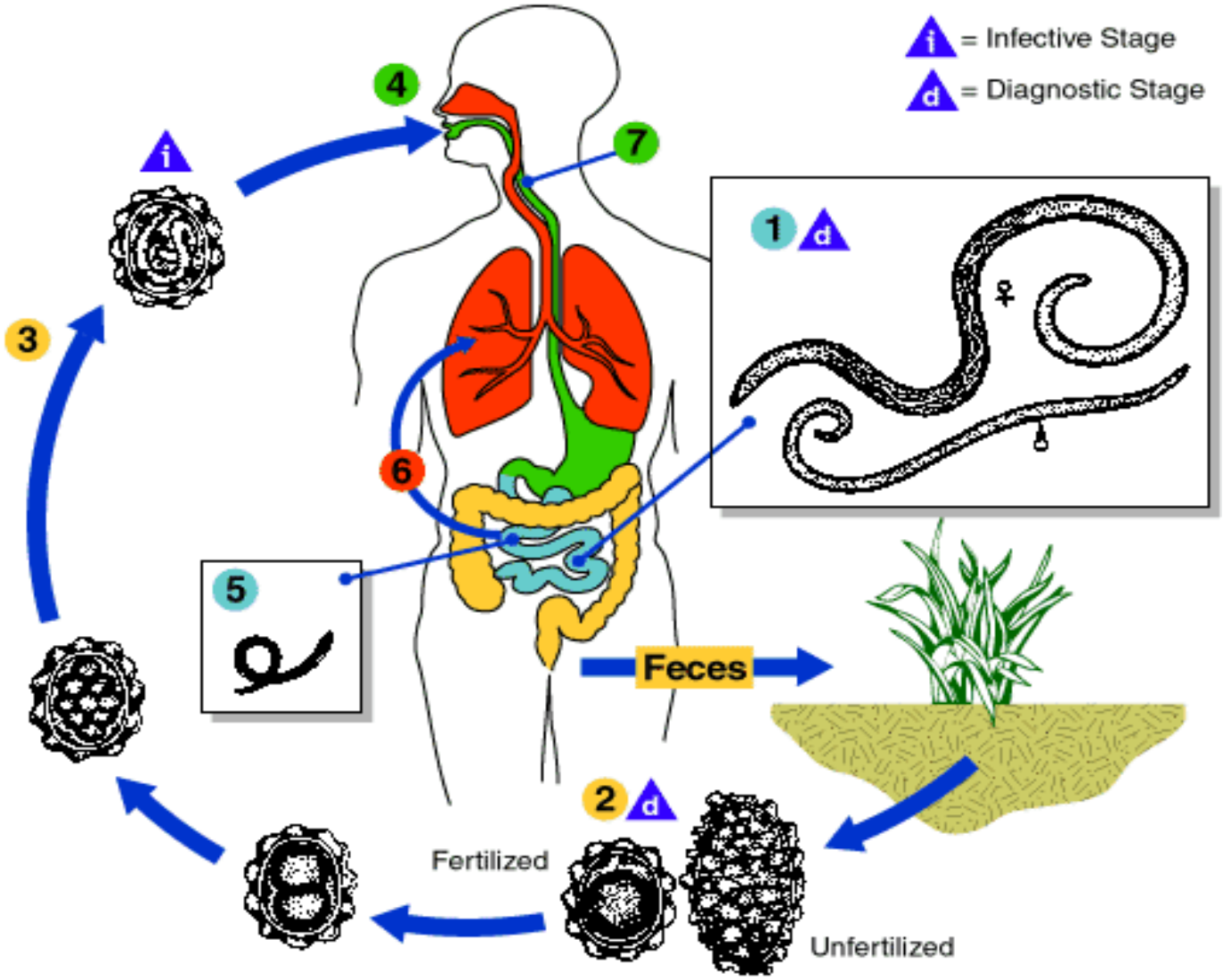
- Fecal – oral transmission
- Reinfection possible

Habitat

- small intestine

Infective stage

- Embryonated egg
- Each female produces 200,000 eggs a day
- Ascaris eggs are capable of survival within harsh environmental conditions, including dry or freezing temperatures.
- When ingested they hatch in small intestine , migrate through the venous system to lungs where they break into the alveoli then to the bronchial tree before they are swallowed and develop into mature worm in the intestine.


i = Infective Stage
d = Diagnostic Stage
1 d
2 d
3
4
5
6
7
Feces
Fertilized
Unfertilized

Pathogenesis and spectrum of disease

- Disease is called Ascariasis
  - Children and young adolescents have higher infection rate
- Many A. lumbricoides infections are asymptomatic
- Symptomatic:
  - Pulmonary symptoms during migration (loeffler's syndrome which is respiratory symptoms, infiltrates and eosinophilia)
  - GI manifestations: malnutrition, anemia, malabsorption, steatorrhea and intestinal obstruction, biliary obstruction and jaundice

Lab diagnosis

- Eosinophilia
- Microscopic examination (looking for eggs)

  Direct smear (stool mixed with saline) identified for both (fertilized and infertile)eggs
- Adult worm may also be identified in feces
- Larvae may be found in sputum or gastric aspirates

THERAPY

oral Albendazole 400MG STAT

ENTEROBIUS VERMICULARIS (pinworm)

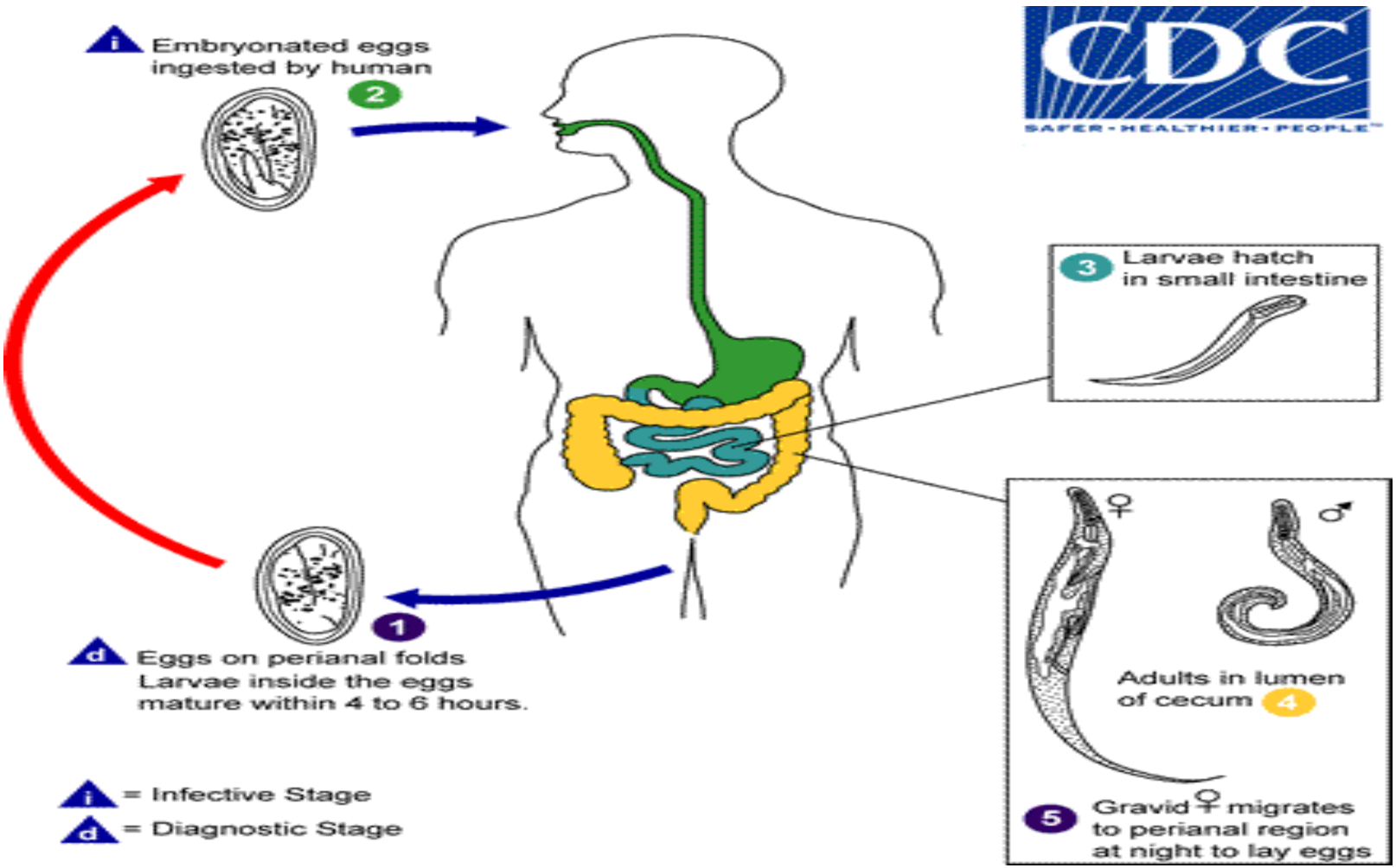
- Small , thin and white worm
- distributed worldwide and commonly identified in group settings of children ages 5 to 14 years
- The female worm measures 8 to 13 mm long with a pointed “pin” shaped tail (11000 ova and live for a month)
- The males measure only 2 to 5 mm in length, die following fertilization, and may be passed in feces.
- Habitat : large intestine (Caecum)

Mode of transmission

- Fecal-oral or inhalation (autoinfection)
- Sexual transmission has been reported
- direct; transmission occurs from an infected host to another
- Infections are associated with institutional crowding and families

Life cycle

- The female migrate at night to the perianal area where they deposit eggs.
- Eggs embryonate within hours and transferred from their by above mentioned routes


i Embryonated eggs ingested by human
2
3 Larvae hatch in small intestine
d Eggs on perianal folds
Larvae inside the eggs mature within 4 to 6 hours.
1
Adults in lumen of cecum 4
5 Gravid ♀ migrates to perianal region at night to lay eggs
i = Infective Stage
d = Diagnostic Stage
CDC
SAFER·HEALTHIER·PEOPLE™

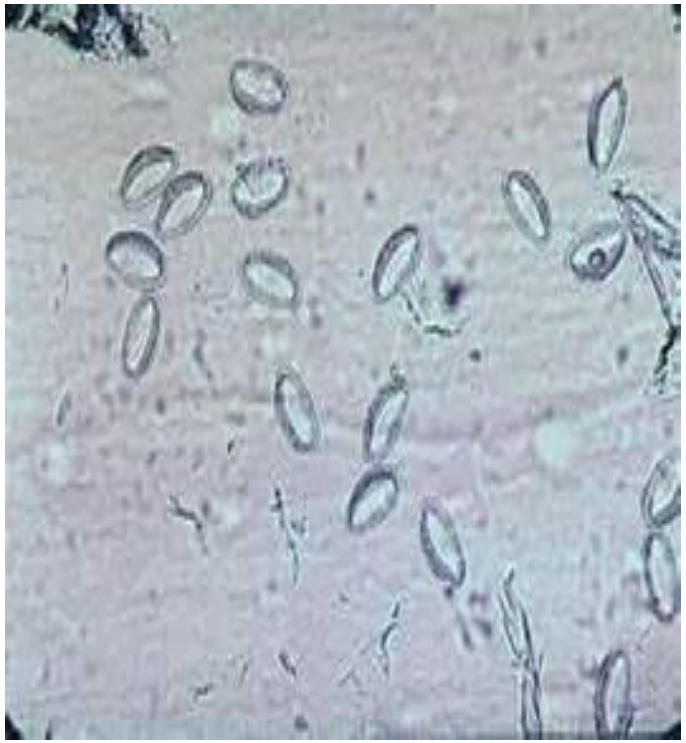
- **Clinically:**

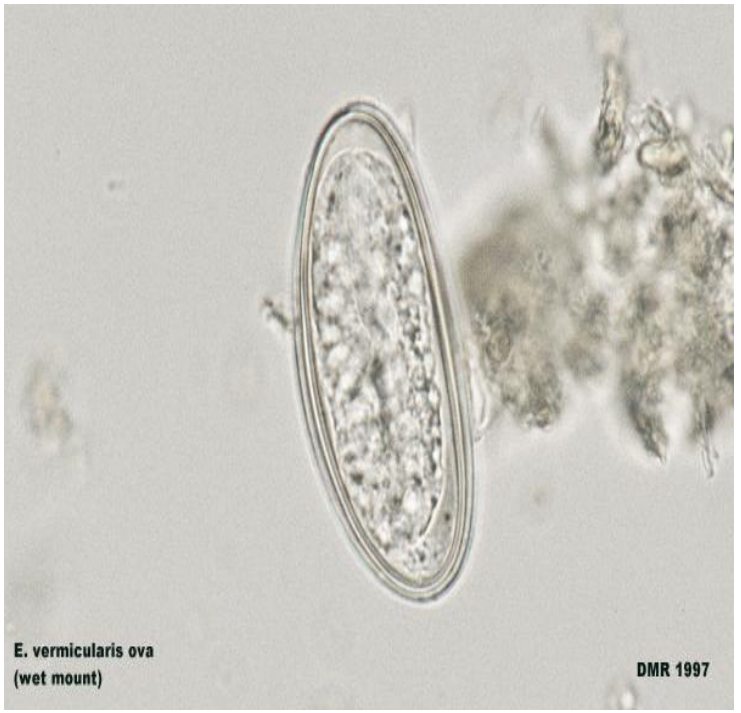
❑Infections with E. vermicularis are typically asymptomatic

❑The most common complaint is perianal pruritus (itching)

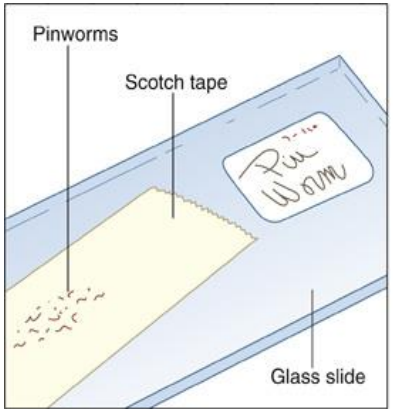
❑the parasite may migrate to other nearby tissues, causing appendicitis, oophoritis, ulcerative bowel lesions..

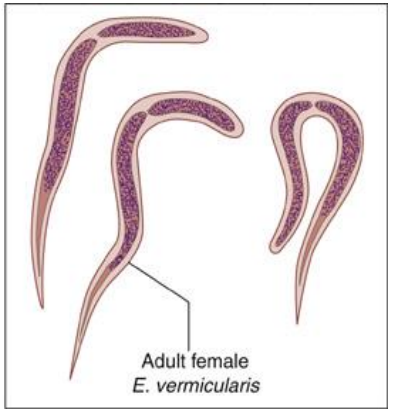
- **Diagnosis** is typically by microscopic identification of the characteristic flat-sided ovum
- the method that used for diagnosis of pinworm is a cellophane (Scotch) tape
- **Treatment**: albendazole 400 mg stat repeated at 2w

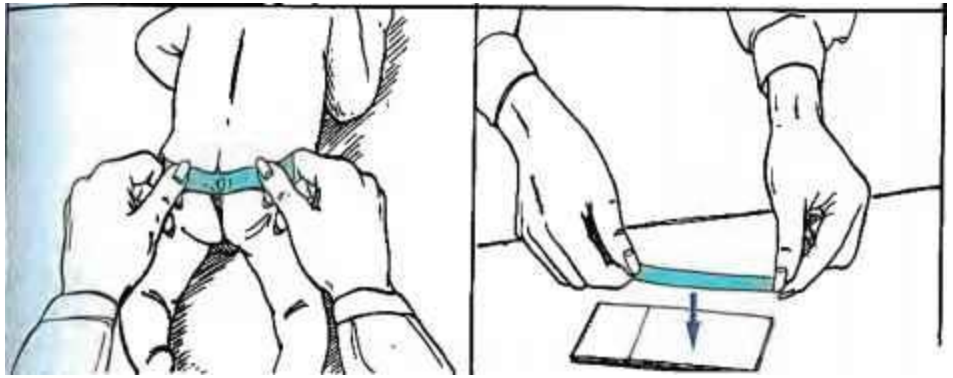




Enterobius vermicularis eggs







- **Hydatid cysts (*Echinococcus granulosus*):**

➢ Echinococcus is **the smallest** of all tapeworms (3 to 9 mm long)

➢ E. granulosus is a tapeworm found in the small intestine of the **definitive host**, the **canine**.

➢ Eggs are ingested by the **intermediate hosts** and include a variety of mammals including **sheep, cattle and humans.**

➢ **Humans** are typically **accidental hosts** and are considered a deadend since the life cycle of the organism is unable to continue in a human host leading to **hydatid cysts**

- Hydatid cysts (*Echinococcus granulosus*):

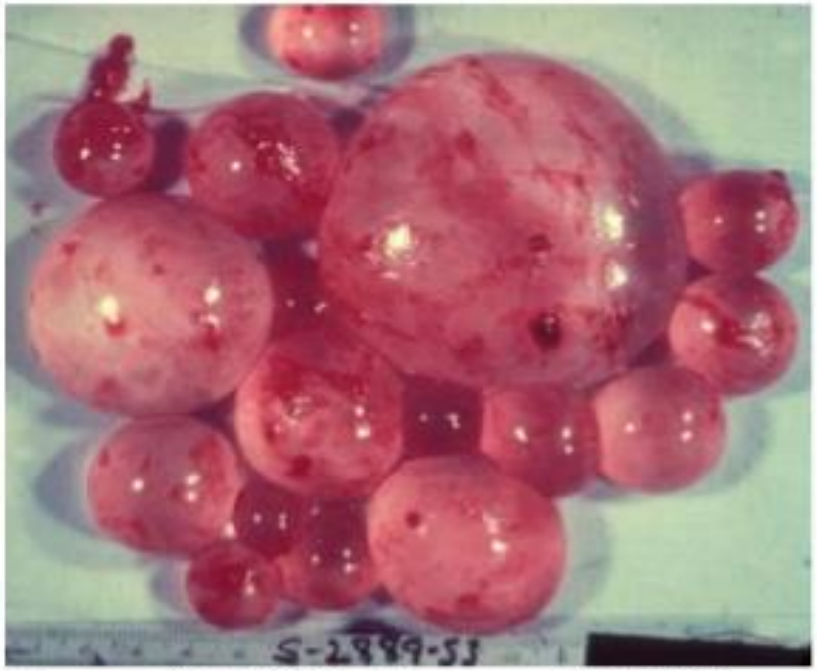
- **Hydatid disease** in humans is potentially dangerous depending on the size and location of the cyst.
- Majority occurs in liver and lungs and usually asymptomatic
- Some cysts may remain undetected for many years until they grow large enough to affect other organs.

➢ **Diagnosis**: incidentally by radiology , serology

➢ **Treatment:** surgery, albendazole

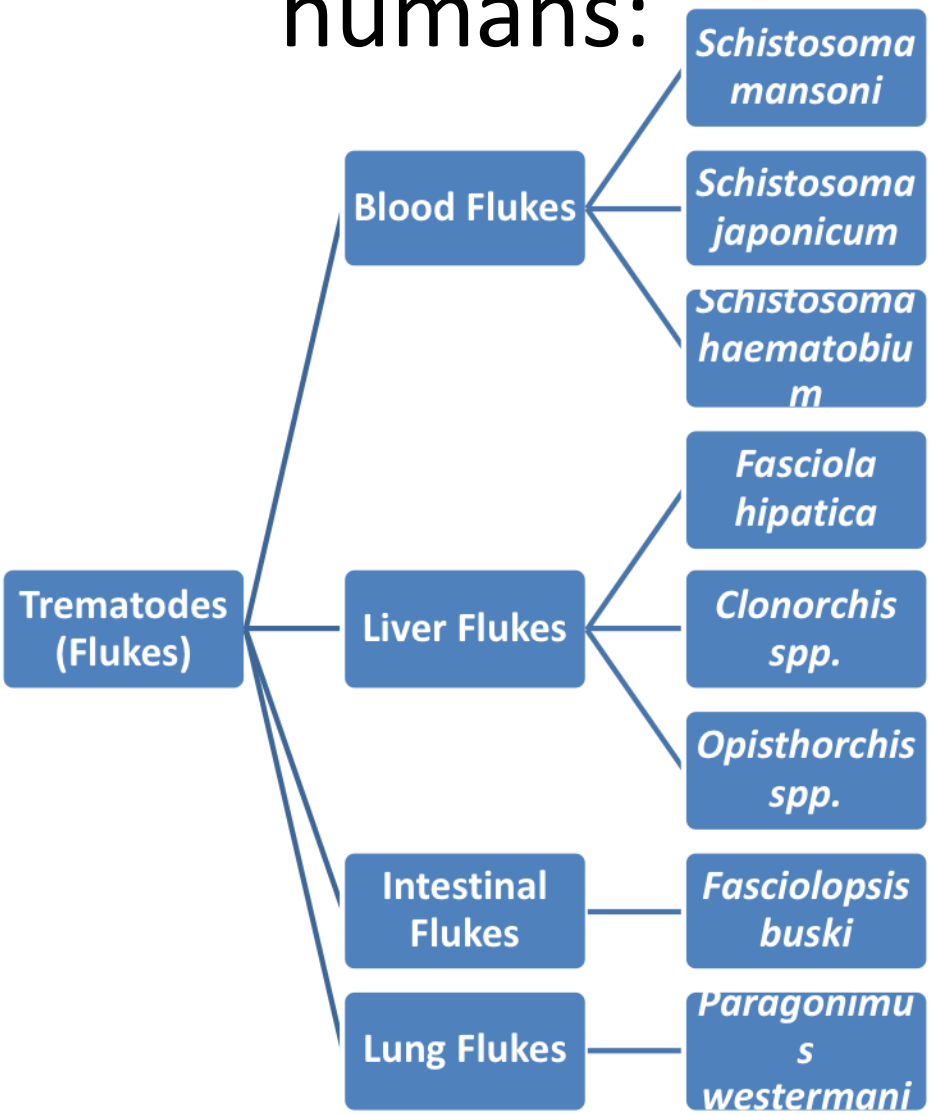
Cyst structure

At gross examination, the vesicles resemble a bunch of grapes



- Sites of hydatid cyst: liver (65%), lungs(25%), muscle, spleen, kidney, heart, bones, brain etc
- Hydatid cysts – slow growing : 2-3cm/yr

Trematodes classification based on the basis of their final habitats in humans:



SCHISTOSOMIASIS

Is a human disease syndrome due to infection by *Schistosoma*

Most human schistosomiasis is caused by

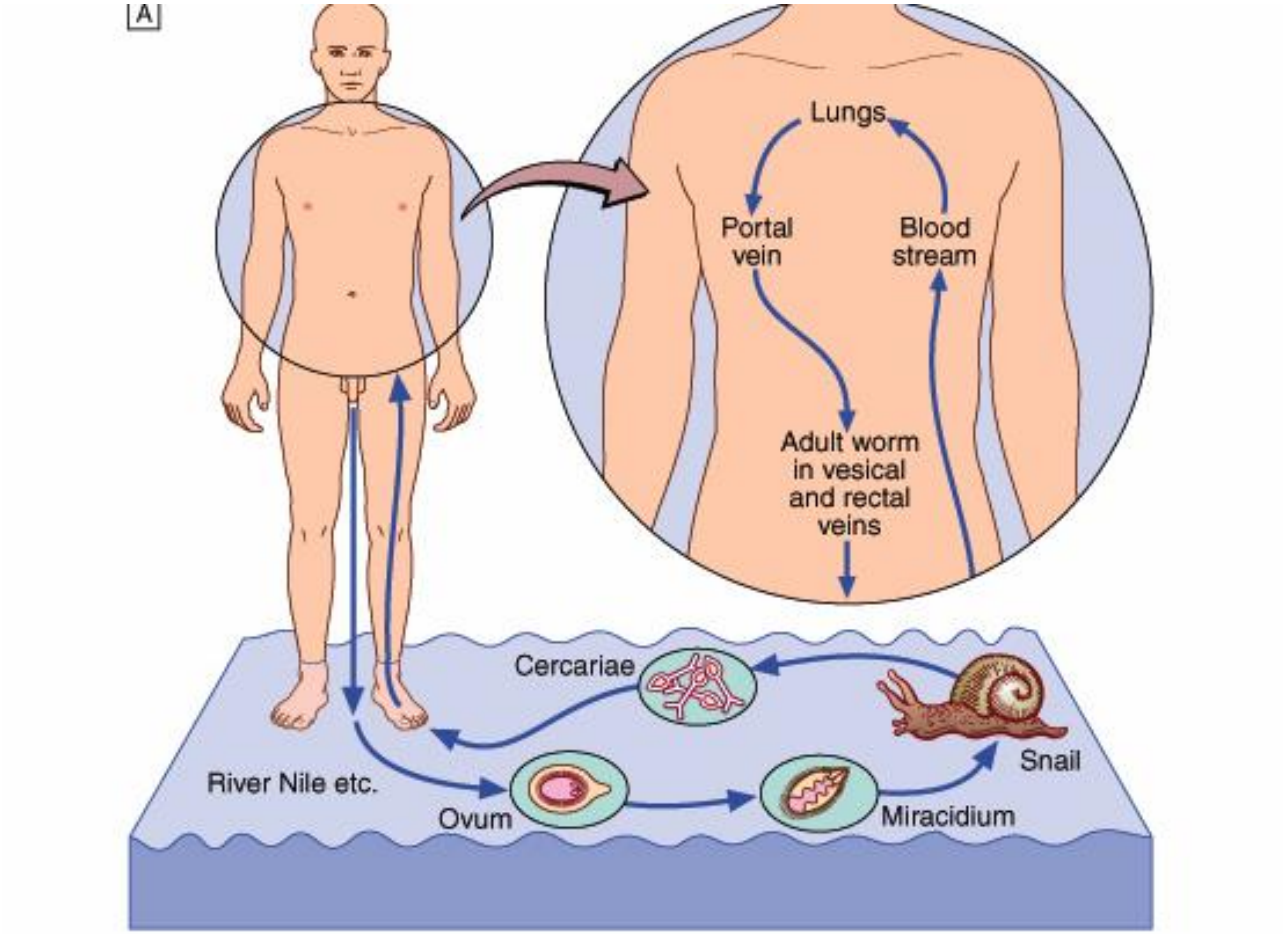
1. Schistosoma mansoni (mainly GIT).
2. Schistosoma japonicum (mainly GIT).
3. Schistosoma haematobium discovered by Theodor Bilharz in Cairo in 1861 (mainly UTS).

- It is estimated that than 200 million are infected all over the world & about 500-600 million are exposed to infection..
- Adult worm inhabits the portal venous system.

LIFE CYCLE

- The ovum is passed in the faeces of infected individuals and gains access to fresh water where the ciliated miracidium inside it is liberated; it enters its intermediate host, a species of freshwater snail, in which it multiplies .
- Large numbers of tailed cercariae are then liberated into the water.
- Infectious cercariae penetrate human skin and migrate through the lung and the liver to reach portal venous system

LIFE CYCLE


A
Lungs
Portal vein
Blood stream
Adult worm in vesical and rectal veins
Cercariae
Snail
River Nile etc.
Ovum
Miracidium

- ***Morphology***
- Adult male & female have oral sucker surrounding the mouth anteriorly & ventral Sucker on the ventral surface with which it attaches itself to the wall of the vessel in which it lives.
- **The male** worm is flat, leaf like &folded to form the gynacophoric canal which enfolds the slender female for almost its entire length.
- testes
- ovary


Oral suckers
Ventral suckers
♂
♀
Gynaecophoric canal
1mm

Pathogenesis and manifestations

- Skin penetration causing itchy rash
- Travel via lung causing respiratory manifestations
- Production of eggs causing granulomatous reaction and sclerosis in portal venous system to eggs deposited in tissues. This may lead to portal hypertention, esophageal varices, HSM and liver failure

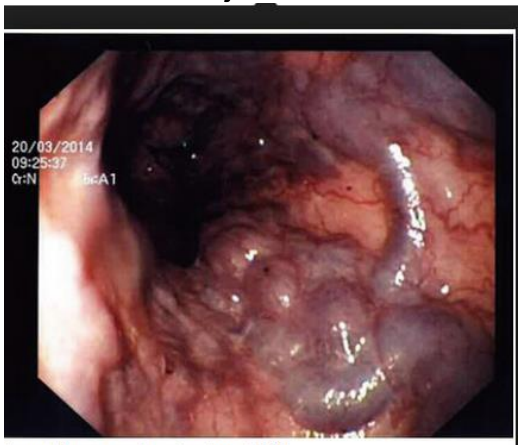


Figure 1 Large esophageal varices at EGD.

DIAGNOSIS

1. CLINICAL
2. HEMATOLOGICAL, BIOCHEMICAL
3. CONFIRMED BY

Detection of ova in STOOL or tissue biopsy

Treatment

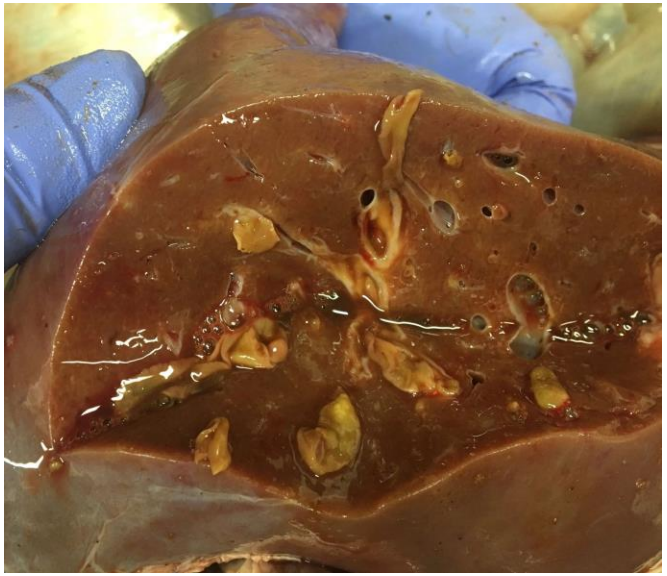
Praziquantel 40mg /kg for all types and as a single dose is treatment of choice

Intestinal flukes

- Intestinal flukes include :
- Fasciolopsis buski
- Heterophyes heterophyes
- Metagonimus yokogawai

Liver flukes

- **Fasciola hepatica**
- **Fasciola gigantica**
- **Clonorchis sinensis**
- **Opisthorchis felineus/viverrini**
- **Dicrocoelium dendriticum**



The End

Thank you