GIT Module
2021-2022
Parasitic Infections
(Schistosomiasis & Gastrointestinal hydatidosis)

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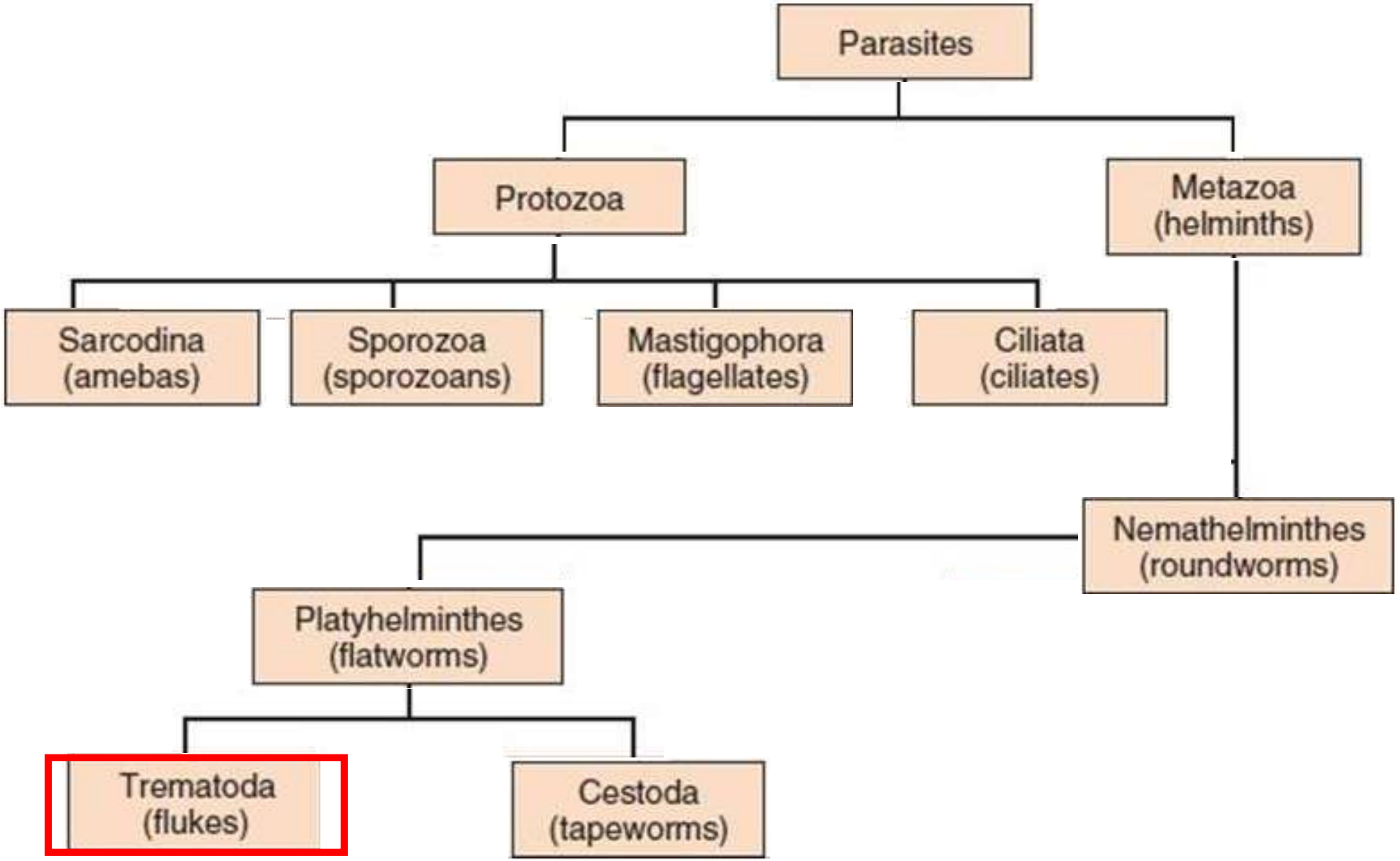
Classification of parasites



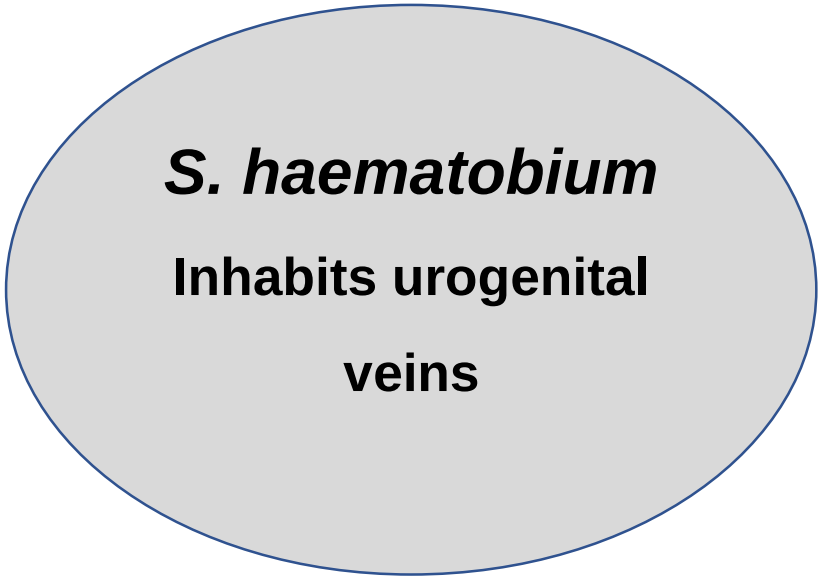
Introduction

- Schistosomiasis is one of mankind's oldest and most pernicious parasitic infections, currently still affecting more than 200 million people worldwide.
- Disease was named after German Theodor Bilharz who identified adult parasite in the 1851.
- **Theodor Bilharz**, a German physician and pathologist, who worked in various hospitals, noticed the worm in white bumps on the mucous membranes of the bladder, ureters, seminal glands and intestine

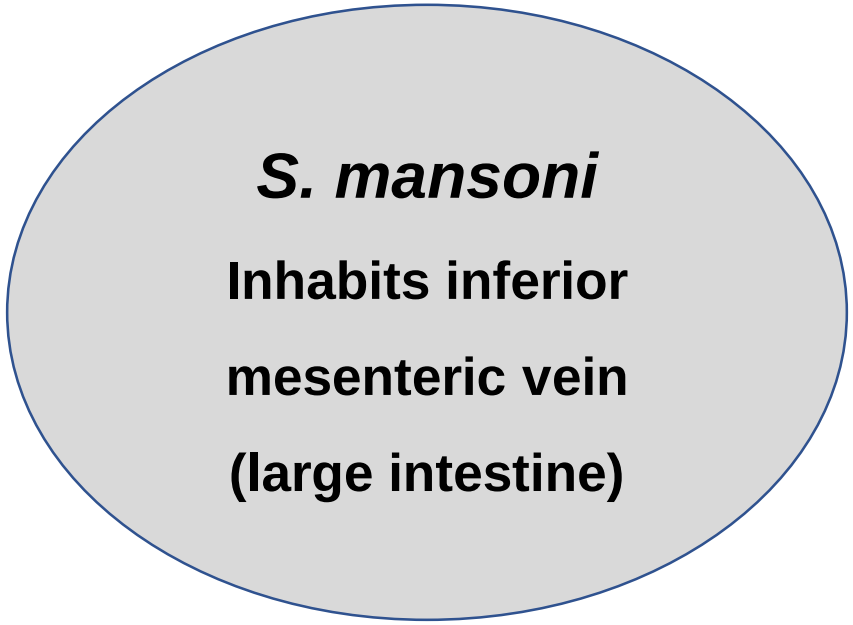
Theodor Bilharz

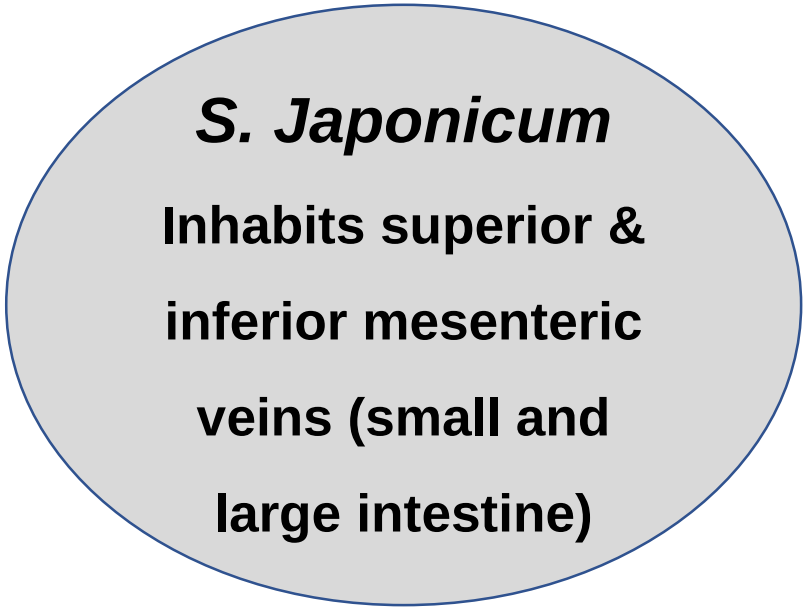
Definition

- Schistosomiasis is a chronic and potentially lethal tropical disease, mainly caused by the parasitic blood flukes.
- With untreated infections generally the infection can persist for 3–10 years and a minority of infected individuals developing life-threatening pathology .

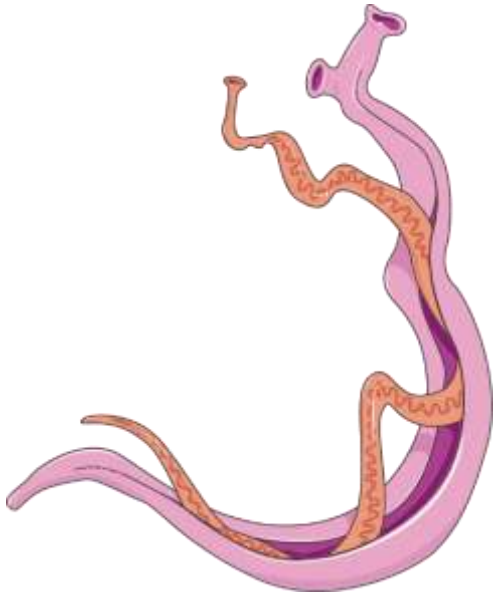


Schistosoma species





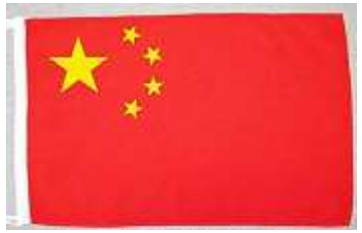
Trematodes (Flukes)



	Flukes	Schistosomes
Shape	Flat and leaf-shaped	Elongated and cylindrical
Sexes	hermaphroditic	Separate sexes
Egg	operculated	Nonoperculated
Transmission	ingestion	Skin penetration
Infective stage	metarcercaria	Cercaria
Intermediate host	2	1

Schistosomes(Blood flukes)

Trematoda (flukes)



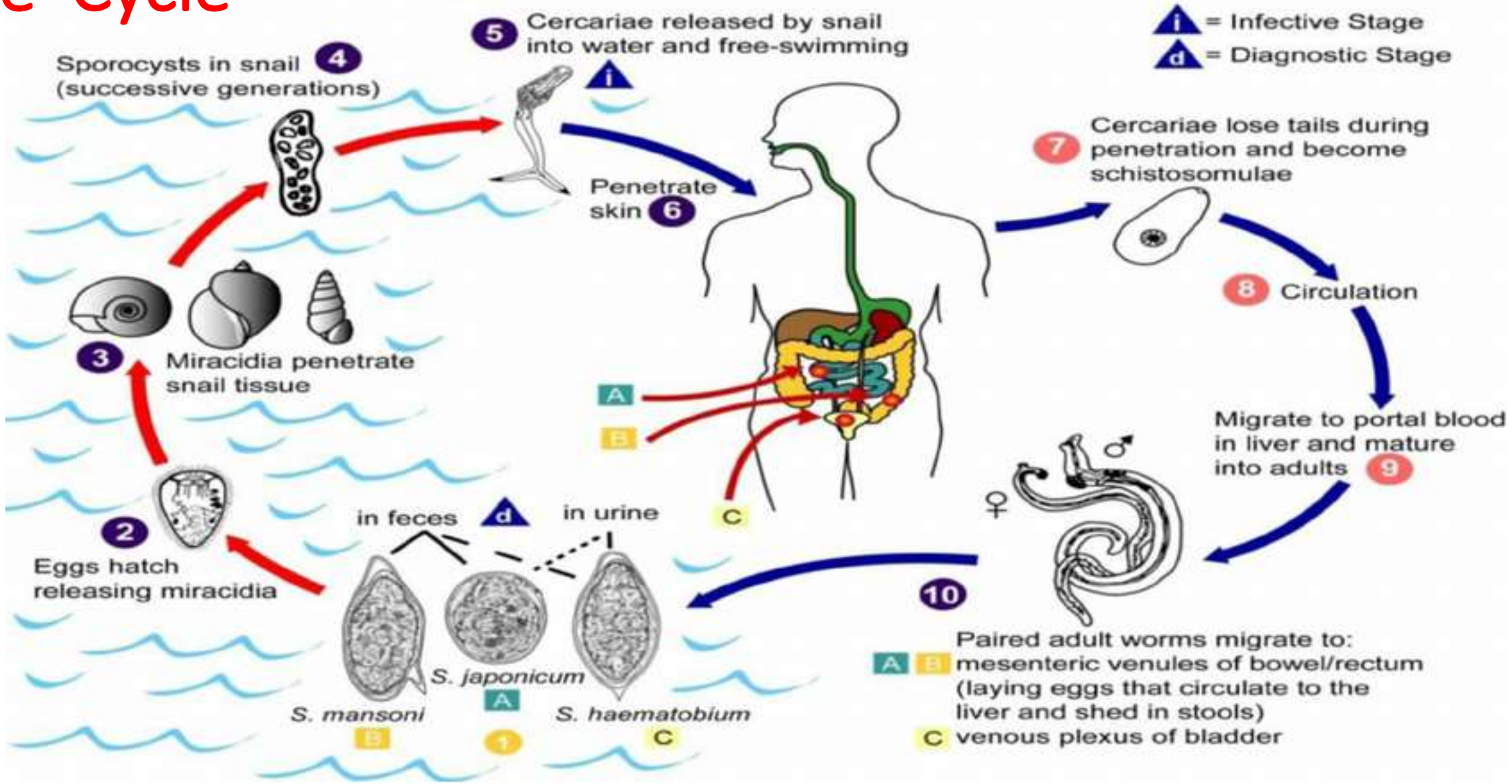
S. Japonicum

S. mansoni

(Nile delta)

Schistosomiasis (Bilharziasis)

Life Cycle



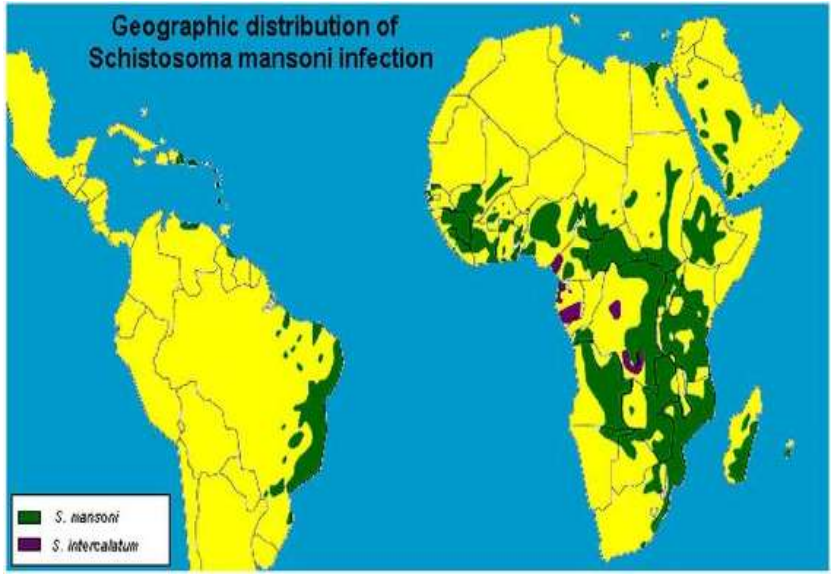
Schistosomiasis (Bilharziasis)

Mode of infection

Man is infected by coming in contact with cercaria in polluted water of canals or drinking polluted canals water containing cercaria. The cercaria actively penetrates the skin or the mucous membrane through the action of penetration glands

Intestinal Schistosomiasis (Bilharziasis)

❖Caused by *S. mansoni* and *S. japonicum.*



S. mansoni

❖**Geographical distribution:** Nile Delta, Africa, Middle East, South America.

❖**D.H:** Man

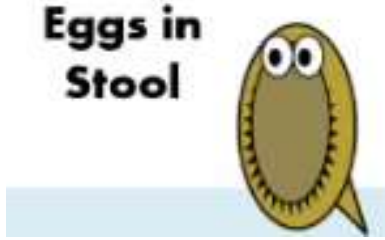
❖**Reservoir hosts (R.H)** : Monkeys &rodents.

❖**Habitat:** Small branches of inferior mesenteric vein of rectum &pelvic colon.

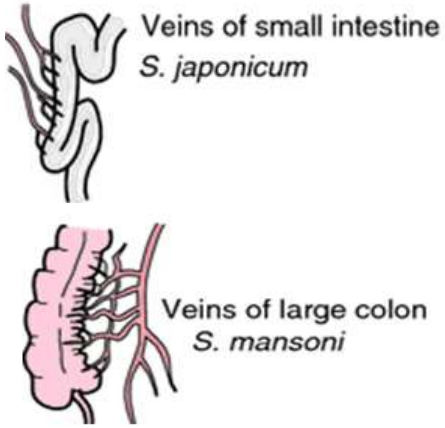
❖**Maturation** of adult worm occurs in intrahepatic branches of portal vein.

Stages of disease

Eggs in Stool

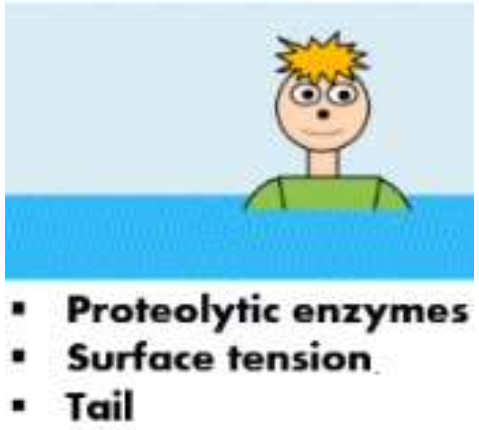


3- Stage of egg deposition

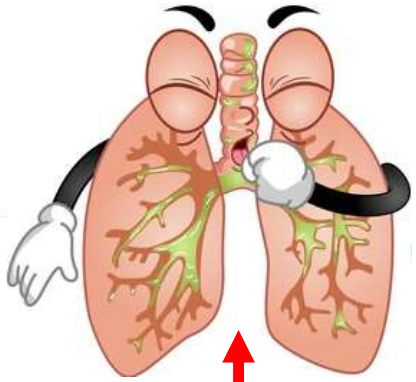


4- Stage of tissue reaction, repair and fibrosis

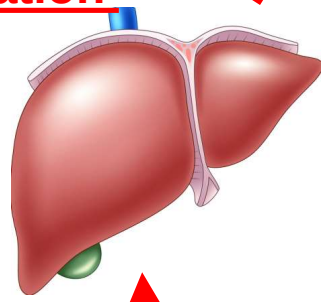
1- Stage of invasion



Blood



2- Stage of migration



2- Stage of migration

Intestinal Schistosomiasis (Bilharziasis)

Stages of disease

1- Stage of invasion

Manifestations

- Skin lesion due to cercarial penetration.
- Local dermatitis, irritation, itching and papular rash.

Intestinal Schistosomiasis (Bilharziasis)

Stages of disease

2- Stage of migration

❖**Lung :** Irritation due to passage of schistosomulum causing minute haemorrhage, cough, sputum, dyspnea and eosinophilia, and pneumonitis.

❖**Liver :** Enlarged tender liver and spleen.

❖**Toxic symptoms:** Due to metabolic products of maturing parasites causing fever, anorexia, headache, malaise and muscle pain.

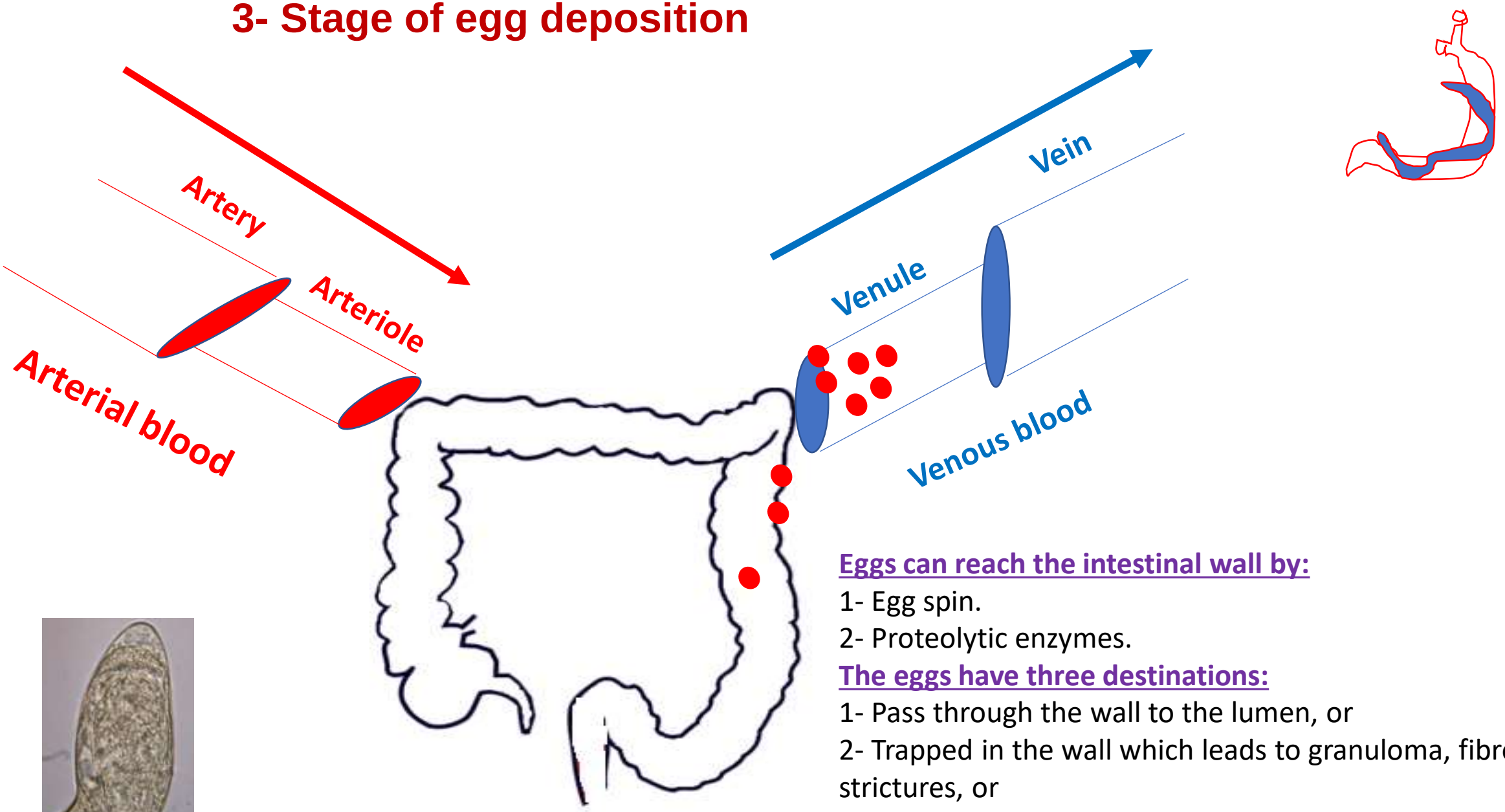
Intestinal Schistosomiasis (Bilharziasis)

Stages of disease

3- Stage of egg deposition (acute schistosomiasis)

- ~3–5 weeks post infection: The development of schistosomes into sexually mature, egg-producing adults occurs within the portal vein.
- Once sexual maturity is reached, worm pairs migrate toward the mesenteric vessels .
- Adult S. mansoni worms reside deep within the mesenteric veins of the intestine, where they feed on blood and acquire nutrients necessary for growth
- Each worm pair produces ~300 eggs daily.

3- Stage of egg deposition



Eggs can reach the intestinal wall by:

1- Egg spin.

2- Proteolytic enzymes.

The eggs have three destinations:

1- Pass through the wall to the lumen, or

2- Trapped in the wall which leads to granuloma, fibrosis, and strictures, or

3- Eggs moved with the venous circulation forming embolism. (Liver, lung, CNS, skin, ….)

Intestinal Schistosomiasis (Bilharziasis)

Stages of disease

3- Stage of egg deposition (acute schistosomiasis)

- Finally, egg aggregation supports extravasation by releasing proteases creating channels from the intravascular to intraluminal space .
- **Eggs deposited in the pelvic colon and rectum. Expulsion of eggs in stool ➲tissue damage and haemorrhage.**

Symtome

- ❖Abdominal pain.
- ❖Frequent motion, dysentery with blood and mucus in stools.

Intestinal Schistosomiasis (Bilharziasis)

Stages of disease

4- Stage of tissue reaction, repair and fibrosis (chronic or late stage)

❖Trapped eggs in the intestinal wall➲ formation of polyps, granuloma, papillomata and sandy patches.

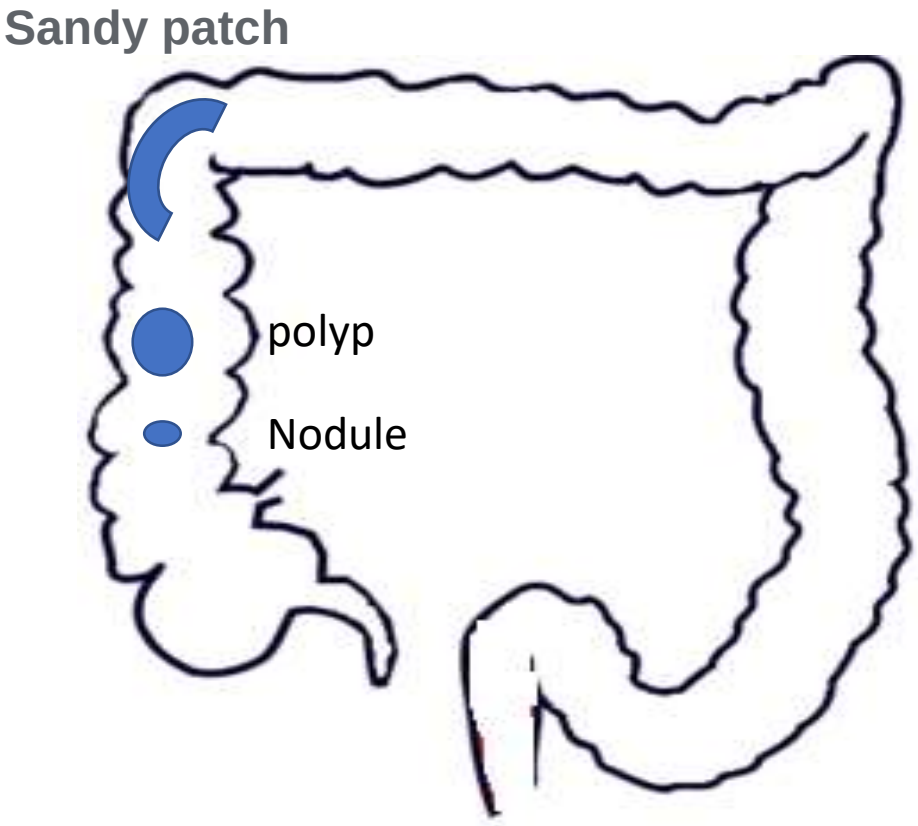
❖Later on, the intestinal wall becomes fibrosed and thickened➲ stricture of the wall.

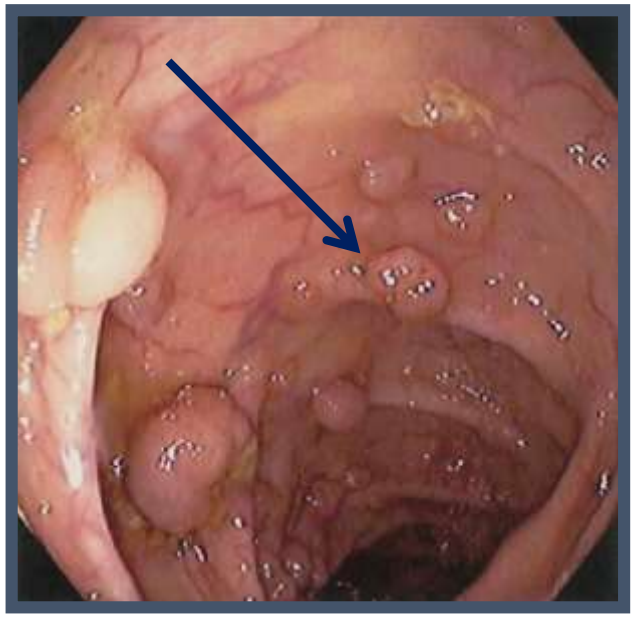
❖Sinuses or fistula can occur.

❖Rectal prolapse.

❖ The fibrotic complications that follows granuloma resolution is the main cause of pathology and lethality in schistosomiasis.

4- Stage of tissue reaction, repair and fibrosis (chronic or late stage)



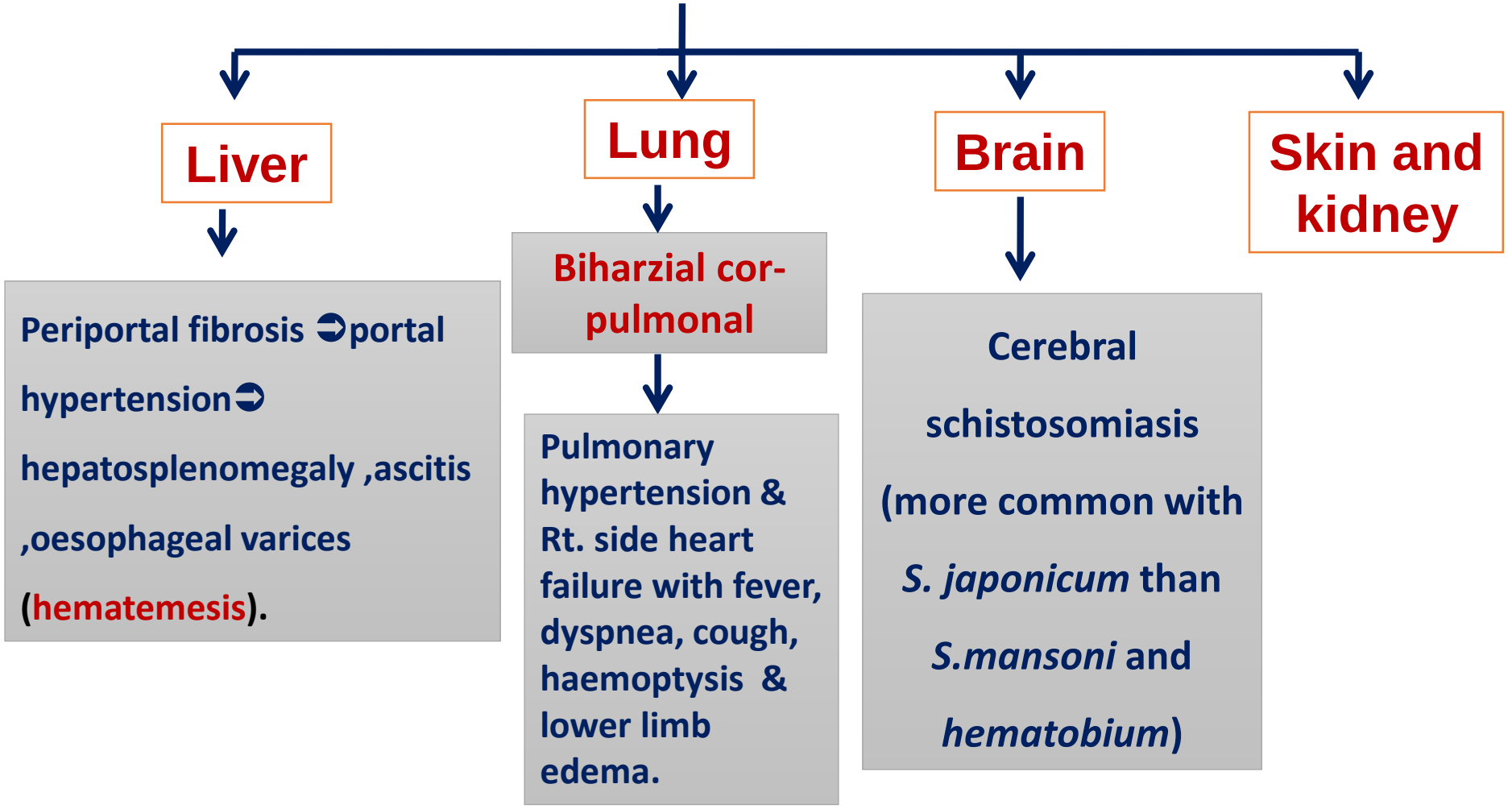


Intestinal polyp

Intestinal fibrosis

EGGS THAT FAIL

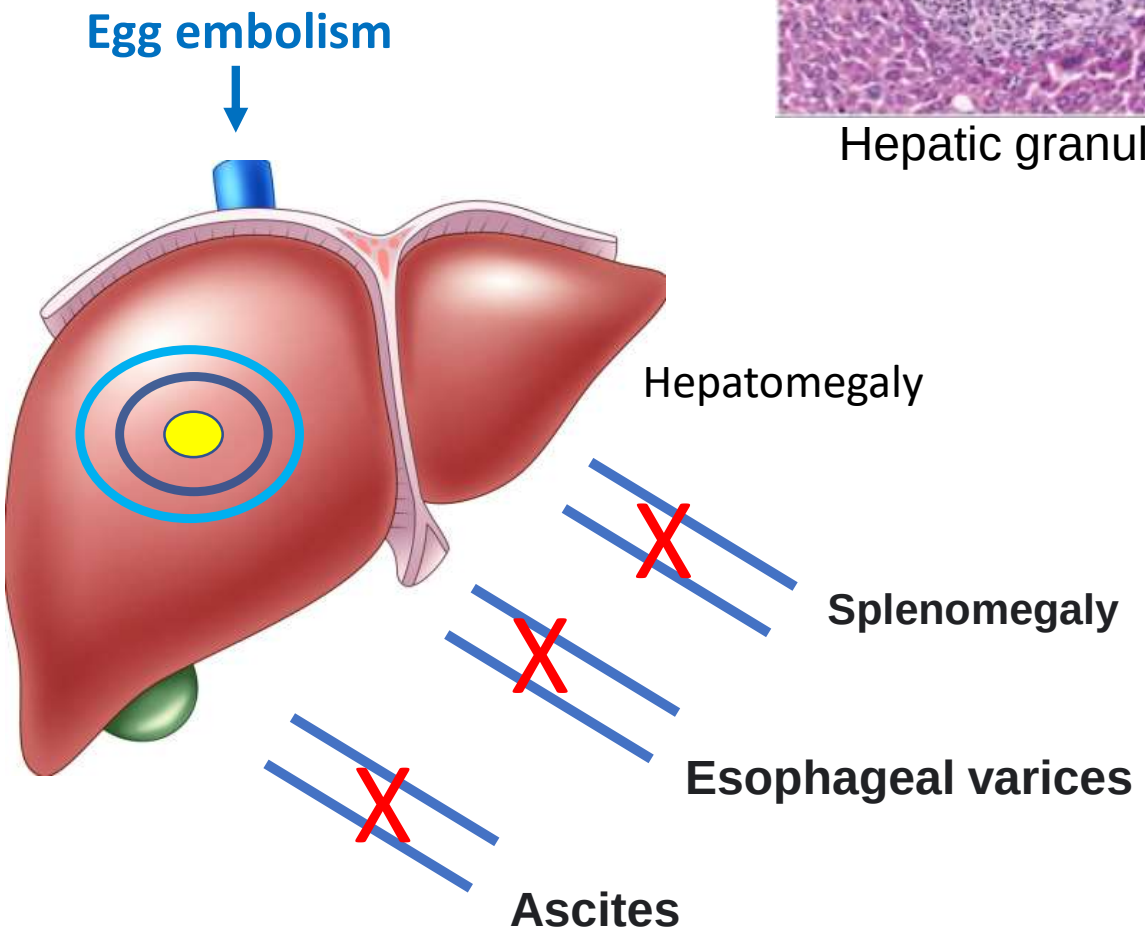
Some eggs are swept back into the blood stream to different organs:-

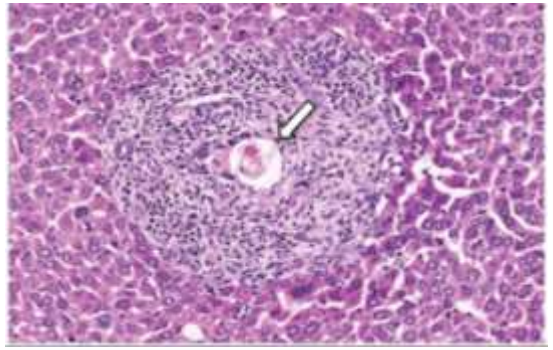


EGGS THAT FAIL

- Only 20–55% of eggs are successful excreted, while the remainder inevitably become trapped within host tissues.
- Eggs are swept systemically through the blood stream can readily be detected at various other locations including the eyes, skin, kidney, spleen and central nervous system (CNS).
- Egg deposition at intended and unintended sites can have serious pathological consequences for the host.
- The more severe disease complications generally manifest many years after infection, reflecting gradual egg accumulation in host tissues and the resolution of granulomas by fibrosis and calcification.

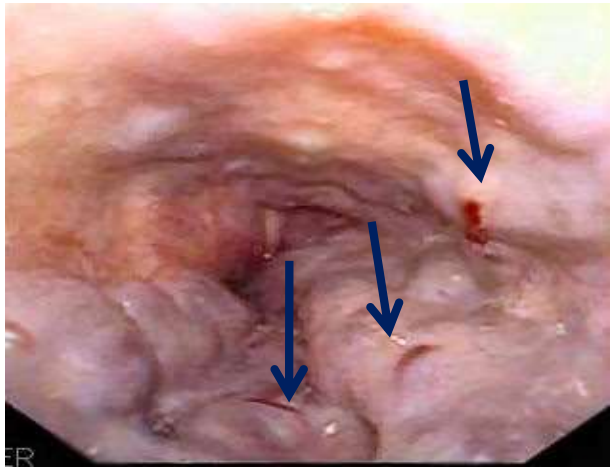
EGGS THAT FAIL



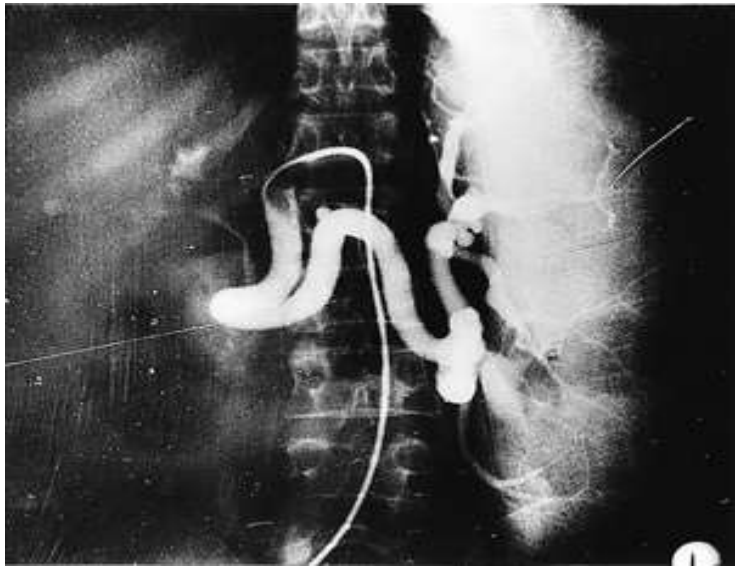


Hepatic granuloma

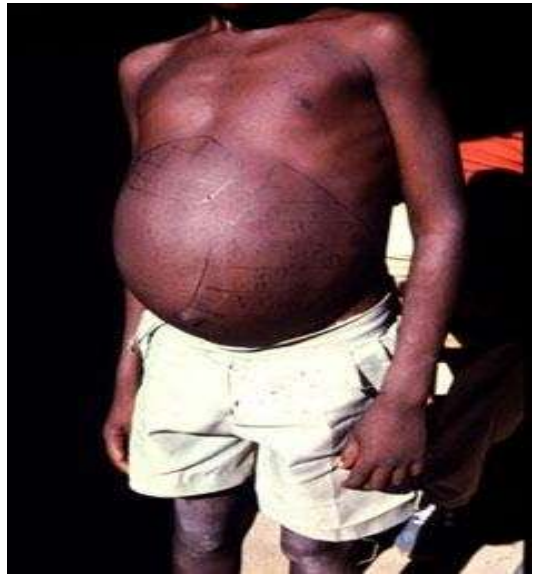
Fibrosed liver



Esophageal varices

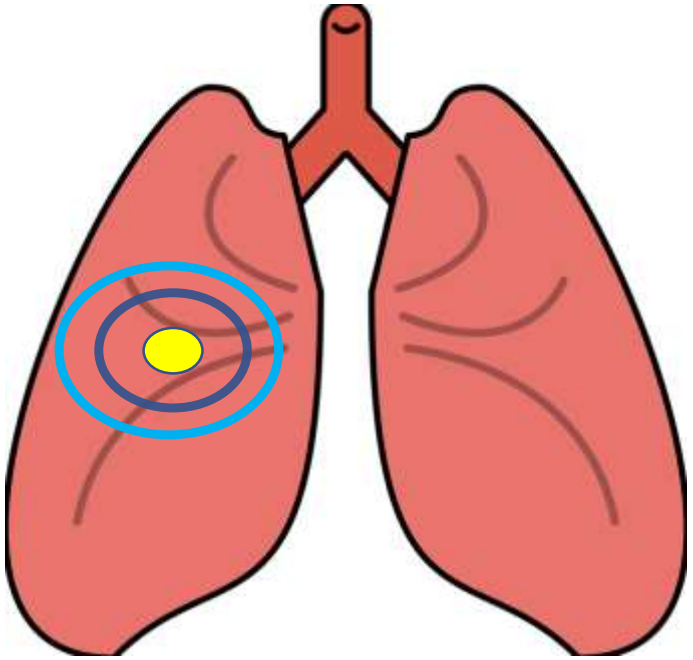


splenomegaly



Ascites

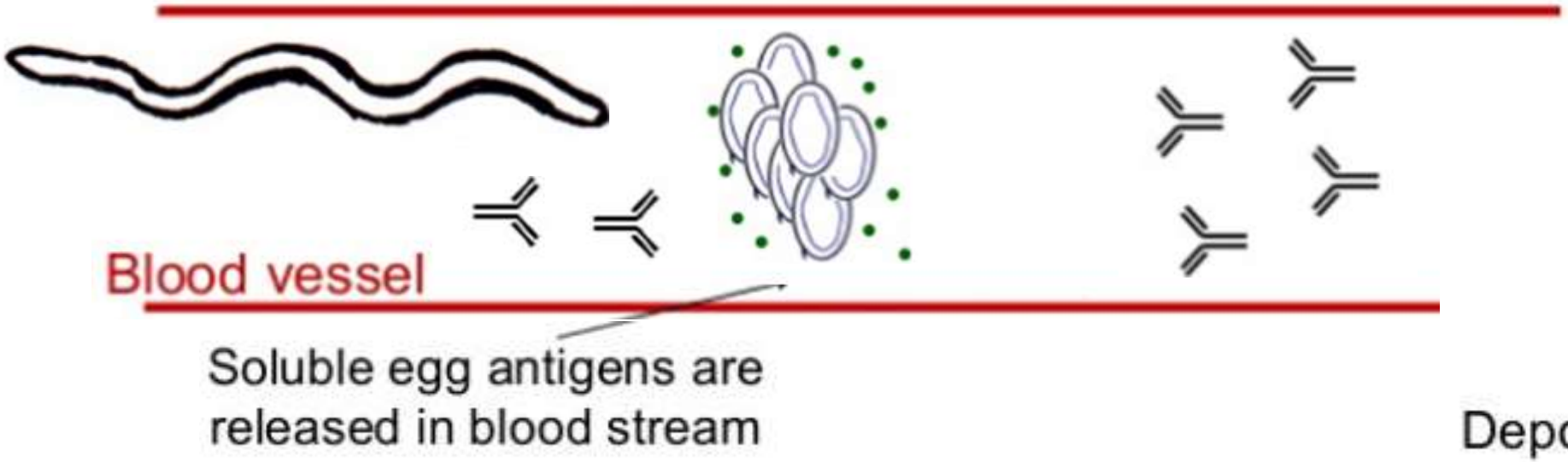
EGGS THAT FAIL



- The embolism goes and blocks the lung arterioles
- This will cause granuloma and fibrosis
- This will cause back pressure in the heart leading to congestive right sided heart failure (called **Cor pulmonale)**.
- This lead to body edema

Katayama Syndrome

- Occurs mainly in S. japonicum infection
- Due to laying large number of eggs antigens.
- The patient suffers from: Fever, chills, diarrhoea, generalized lymphadenopathy, Eosinophilia.
- Thus also called acute toxoemic schistosomiasis.



immune complex

↓

Circulate in blood

↓

Deposited in the tissues

↓

Tissue damage

Laboratory diagnosis

Direct

1) Detection of eggs in the stool by direct smear or concentration .

2) Thick faecal smear .

3) Rectal swab.

4) Rectal biopsy or liver biopsy in chronic stage

Indirect

1) Intradermal test.

2) Serological tests :

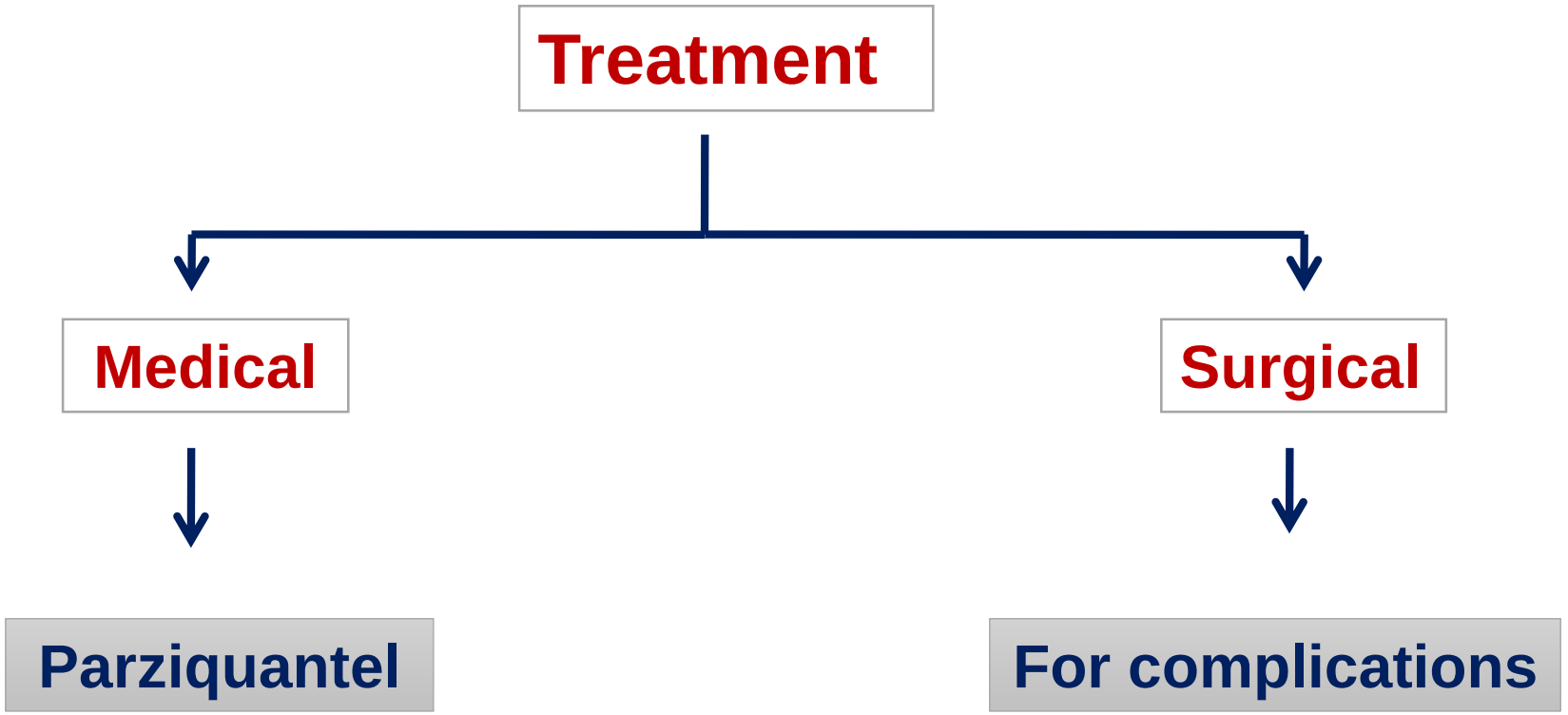
IHAT, CFT, and ELISA.

3) Recently: Detection of circulating *Schistosoma* antigens by using of monoclonal antibodies

4) Anaemia:-

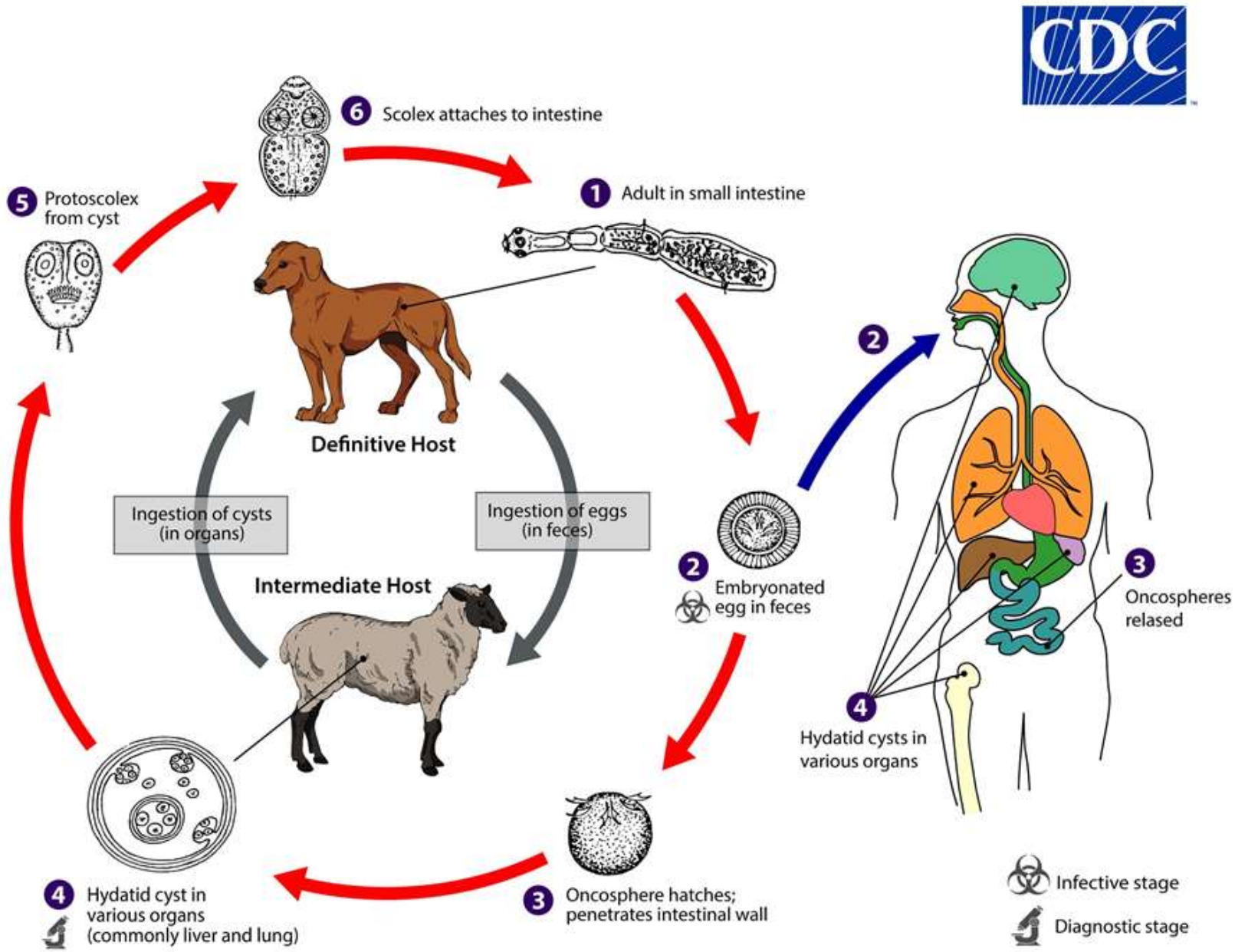
- Iron deficiency anaemia due to blood loss.
- Haemolytic anaemia due to hyper-splenism.

6) Eosinophilia


Treatment
Medical
Surgical
Parziquantel
For complications

Gastrointestinal hydatidosis

Echinococcosis



Gastrointestinal hydatidosis

- Hydatid cysts can be found in almost any organ of the body but the most common sites are liver (50%-77%), lung (15%-47%),spleen (0.5%-8%), and kidney (2%-4%), bone (1-4%) and brain (1- 2%).
- The cycle of *E. granulosus* involves usually dogs as definitive host and sheeps as an intermediate one.
- Humans are accidental intermediate hosts infected through ingestion of water or food contaminated with dog faeces or through direct contact with animal hair that retain eggs on their coat

Pathophysiology

- Gastrointestinal echinococcosis may result from a direct digestive localization of HC, but most often results from the rupture or fistulization in the digestive tract of HC of other localizations; there have been reports of perforations and fistulizations of HC of the spleen in the colon, hepatic HC in the duodenum, mesenteric HC in the small intestine, adrenal HC in the proximal jejunum, retro-peritoneal HC in the rectum or appendix, and pancreatic HC in the duodenum.

Gastrointestinal hydatidosis

- Extrahepatic hydatid cyst usually remains asymptomatic for years.
- Patients mostly present after the cyst becomes large enough to palpate or to cause non-specific symptoms as abdominal discomfort
- Hydatid involvement of the digestive tract is more unusual even in the endemic areas of this parasitosis.

The clinical presentation

- The hydatidosis of the digestive tract can range from simple digestive discomfort, abdominal pain, abdominal distension, intestinal pseudo-obstructions or abdominal mass may also be reported.
- More rarely complicated forms of HC are acute appendicitis, appendiceal gangrene with perforation, intestinal obstruction, single or multiple colonic perforation.
- Surgery is the treatment of choice.

Gastrointestinal hydatidosis

Diagnosis

- The combination of clinical, laboratory, radiological findings upper and lower GI endoscopy help for a preliminary diagnosis.