Trematodes lec 2

د. اسماء زكي شيتاوي

Pathology of *Schistosoma haematobium*

The pathology of chronic schistosomiasis, which is far more common than the acute form of the infection, results from egg-induced immune response, granuloma formation, and associated fibrotic changes .

The eggs induce a granulomatous host immune response which is indicated by lymphocytes , eosinophils, and, also activated macrophages. This granuloma formation induces chronic inflammation.

Although cercarial and adult worms are minimally immunogenic, schistosomal eggs are highly immunogenic and induce vigorous circulating and local immune responses. Adult worms can absorb host proteins. If not attacked by the immune system, they can live for years in the blood stream as they are coated with host antigens.

Egg retention and granuloma formation in the urinary tract can lead to bladder polyps and ulcer.

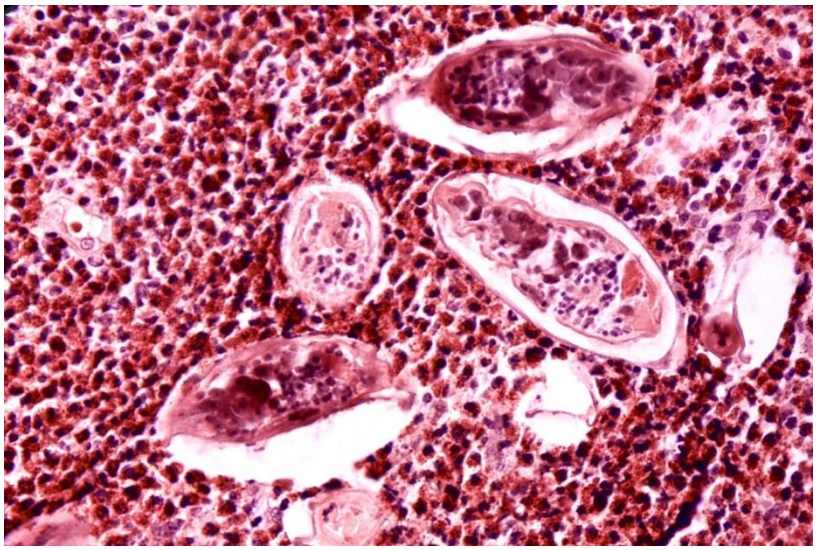
S haematobium infection is also associated with an increased rate of bladder cancer, usually squamous cell rather than transitional cell. Ectopic egg deposition can lead to additional clinical syndromes, including involvement of skin, lungs, brain, muscles, adrenal glands, genitalia, and eyes.

Diagnosis

1. *Microscopic examination:* Detection of eggs with characteristic terminal spines in centrifuged urine sample. Eggs which are deposited in rectum may be occasionally found in faeces. To

optimize recovery of *S. haematobium* in urine, the specimen should be collected between noon and 2 pm (10 am to 2 pm).

2. *Biopsy* Bladder mucosa or rectal biopsies to demonstrate eggs.

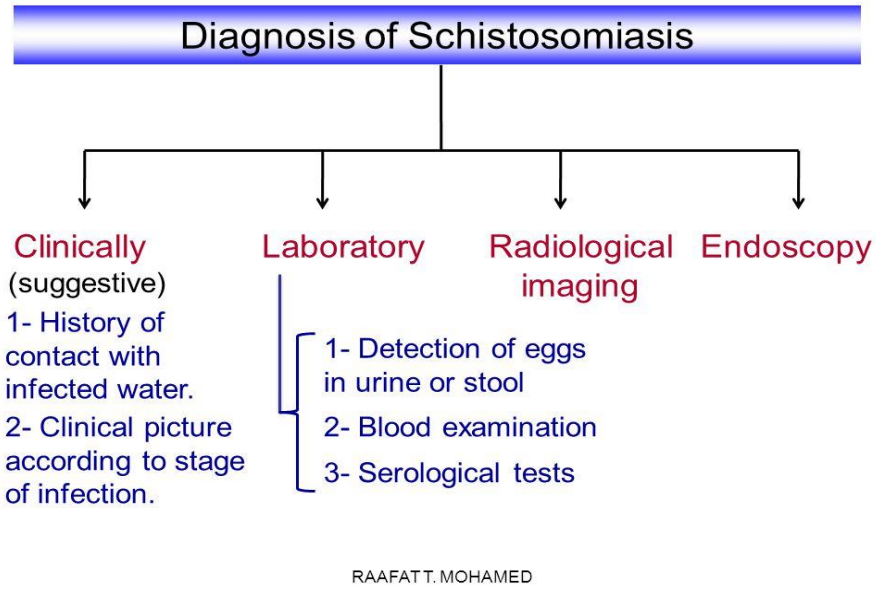


3. Imaging x-ray to detect calcification f bladder. Ultra sound and IVP (intravenous pylograph) shows complication hydronephrosis and hydroureter.

4. Detection of schistosomal antibodies using ELISA. Cannot differentiate between past and recent infections.

5. Detection of antigen in the urine or serum.

6. Molecular diagnosis: PCR on clinical samples.



Treatment

Praziquantel (40 mg/kg/day orally in 2 divided doses for 1 day) is the drug of choice.

Metrifonate is the alternative drug.

Prevention and Control

1. Proper disposal of urine and faeces.
2. Treatment of infected persons.
3. Avoid swimming, bathing and washing in snail-infested water
4. Control of snails

Schistosoma mansoni

Distribution

It is widely distributed in Africa, South America and the Caribbean islands.

Habitat Adult worm lives in the inferior mesenteric vein.

Definitive host: man

Intermediate host : fresh water snail genus *Biomphilarai*

Infective stage: bifurcated tail cercaria

Morphology

Schistosoma mansoni resembles *S. haematobium* in morphology, except the adult worms are smaller and their integuments are covered with coarse tubercles. The uterus of the gravid female contains very few eggs (1–3 only).

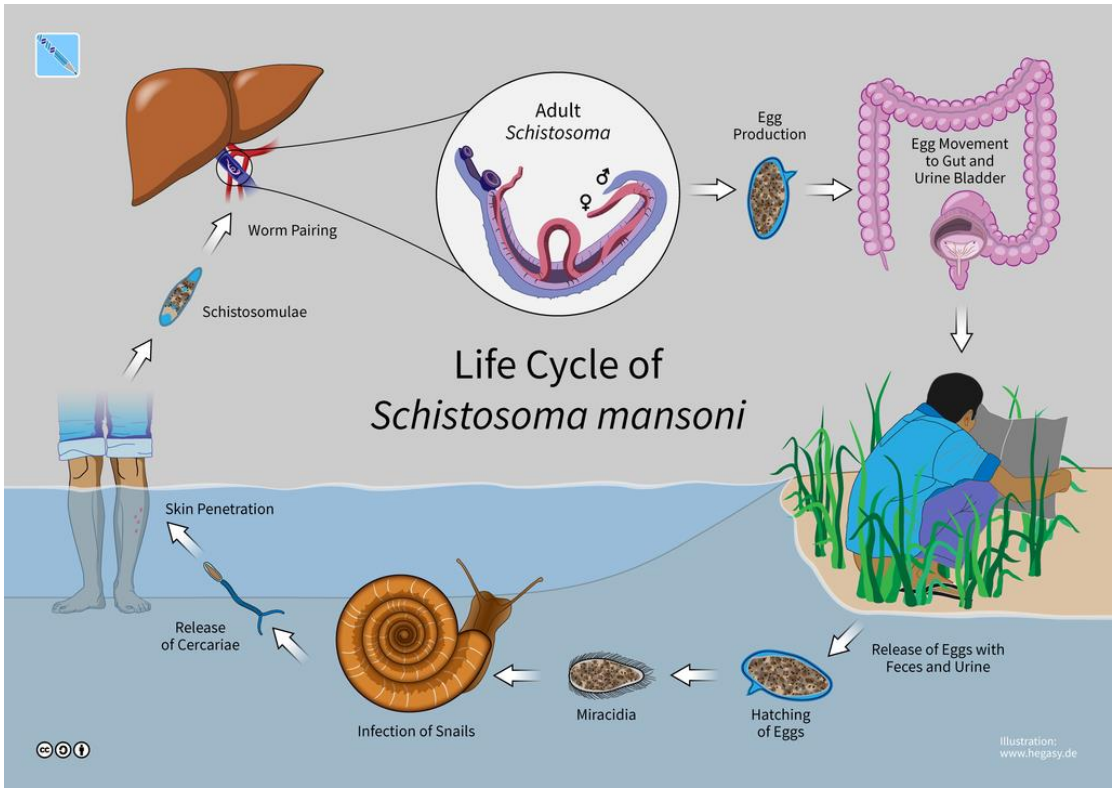
The egg is similar to that of *Schistosoma haematobium* except it has a lateral spine .

The worm passes about 350 egg /day

Life Cycle

Similar to *S. haematobium* except that *Adult* worms in humans reside in the mesenteric venules in various locations, it occurs more often in the inferior mesenteric veins draining the large intestine and when it

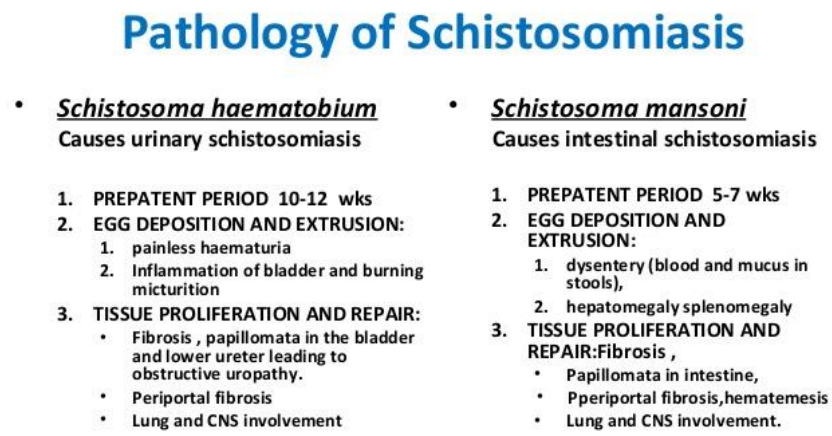
deposited the eggs are moved progressively toward the lumen of the intestine.



Pathogenesis and Clinical Features

1. The prepatent stage begins with cercarial invasion and ends with initiation of egg laying. Cercarial dermatitis may develop after skin penetration by the cercariae .It is self-limiting.
2. Acute stage Katayama fever may develop in acute infection. Symptoms of *schistosoma mansoni* are mainly intestinal. Patients develop colicky abdominal pain and dysentery, which may persist intermittently for many years
3. Chronic stage: The eggs deposited in the intestinal wall of colon and rectum, cause inflammatory reactions causing granulomas, hyperplasia and followed by fibrosis Chronic inflammation can lead to bowel wall ulceration, hyperplasia, and polyposis with heavy infection , eggs that are carried through portal circulation to

the liver may cause hepatosplenomegaly, periportal fibrosis what is called Symmer's fibrosis (also known as "clay pipe stem" fibrosis, these occur due to intrahepatic portal vein calcification which assume the shape of a clay pipe in cross section) and portal hypertension.



Diagnosis

1. *Microscopic examination*

Detection of eggs with lateral spines in stool sample. Stool concentration and sedimentation methods may be used in light infection.

2. *Biopsy* Biopsy of rectal mucosa to demonstrate eggs.

3. *Serodiagnosis*

4. *Molecular diagnosis* PCR on stool sample.

Treatment

Praziquantel (40 mg/kg/day orally in 2 divided doses for 1 day) is the drug of choice, Oxamniquine is also effective

Schistosoma japonicum

Common name Oriental blood fluke

Distribution

Schistosoma japonicum is found in the Far East, Japan, China, Taiwan, Philippines and Sulawesi.

Habitat

The adult worms are seen in the venules of the superior mesenteric vein.

Definitive host: man and domestic animals

Intermediate host snail genus ***Oncomelania***

Infective stage bifurcated tail cercaria

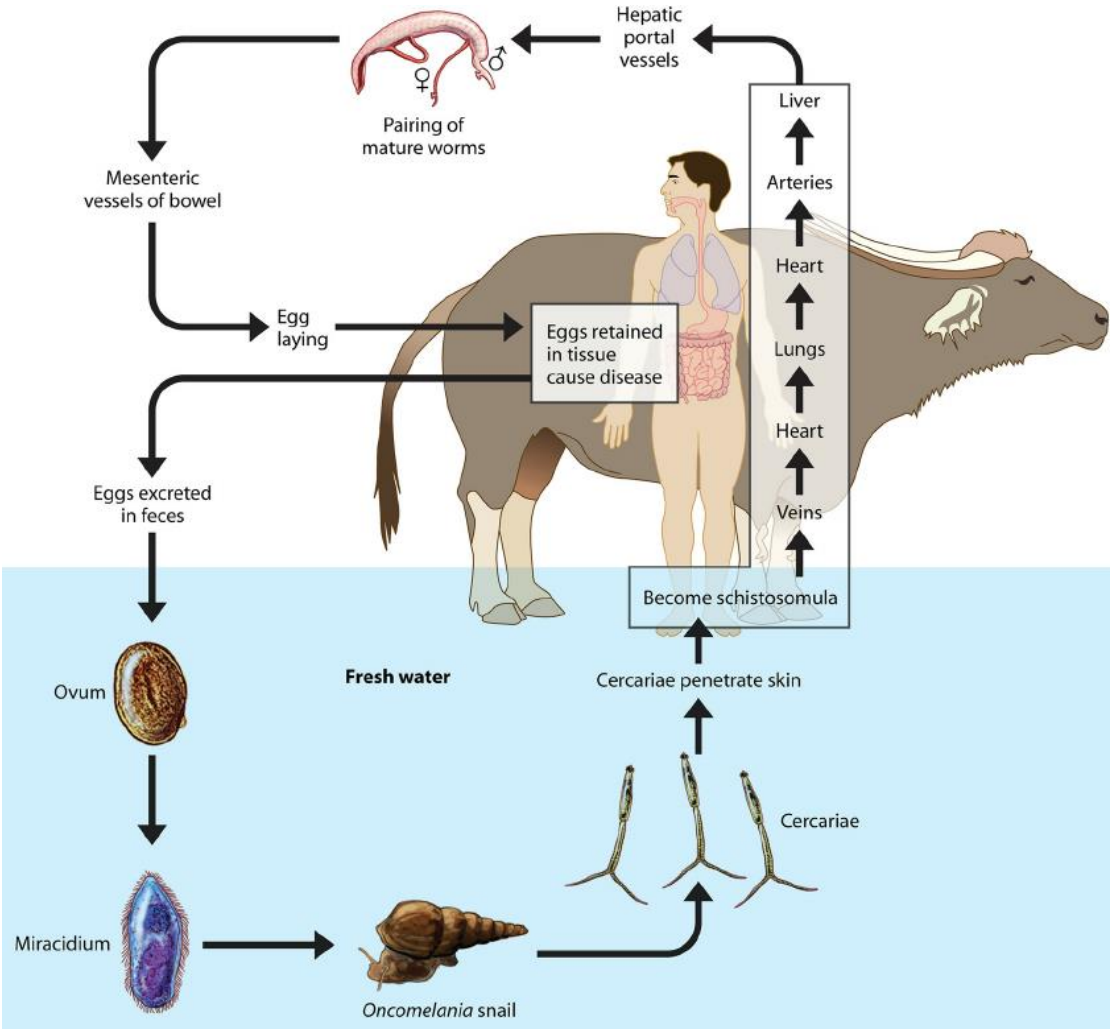
Morphology

Morphologically, they are similar to *S. haematobium* and *S. mansoni* except the adult male is larger than other schistosomes comparatively slender with smooth cuticle. The uterus of gravid female contains as many as 100 eggs at one time and may pass out 3000 eggs daily.

The eggs of *Schistosoma japonicum* are smaller and more rounded than other species, measuring 70-100 µm long by 55-64 µm wide. The spine on *S. japonicum* eggs is smaller and less conspicuous than other species (lateral knob).

Life Cycle

Similar to *S. haematobium*



Pathogenesis and Clinical Features

Its pathogenesis is similar to that of *S. mansoni*, but because of its higher egg output, the clinical manifestations are more severe, during the acute phase. Katayama fever is similar to that seen in *S. mansoni*. Intestinal manifestations are colicky abdominal pain and dysentery. Patient may also develop anaemia. There is hepatomegaly with periportal fibrosis and portal hypertension.

Diagnosis

Similar to that of *S. mansoni*

Treatment

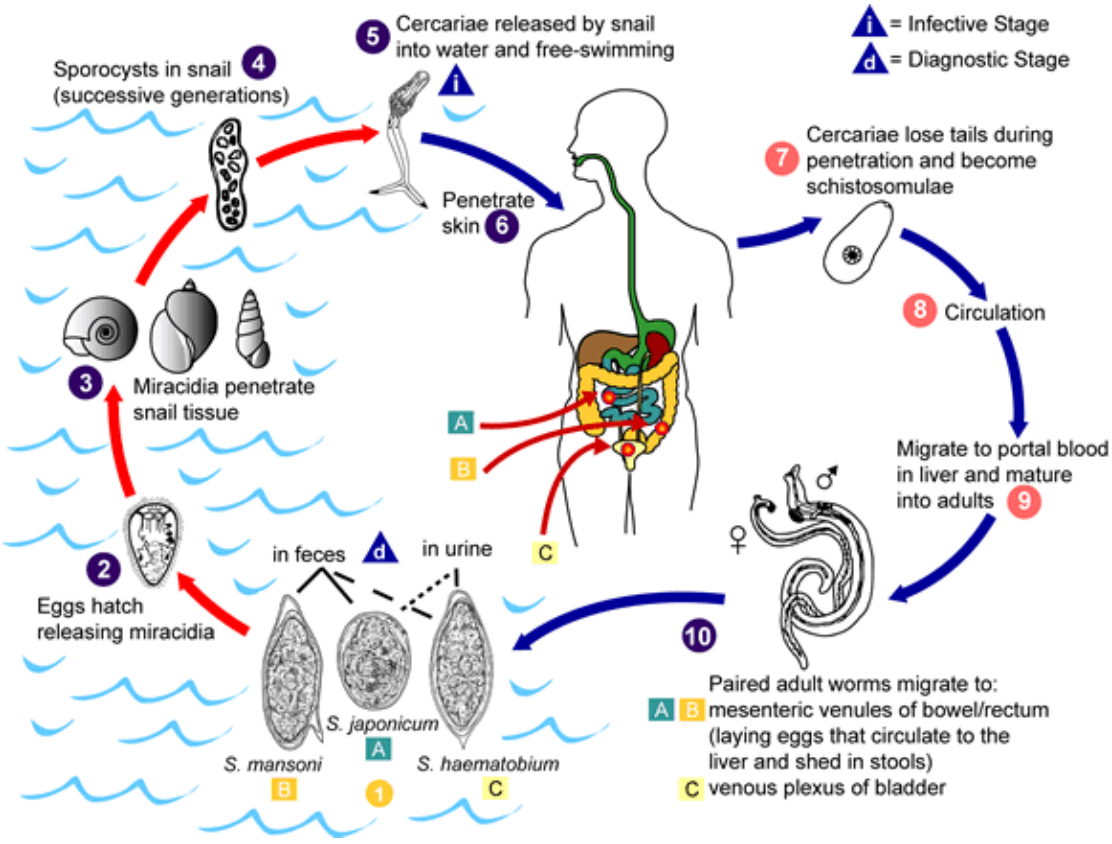
Praziquantel (60 mg/kg/day orally in 3 divided doses for 1 day) is the drug of choice.

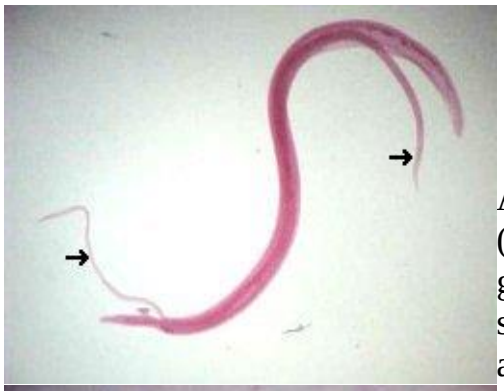
Prevention and Control

Similar to that of *S. haematobium*

Schistosomal Dermatitis

Schistosomes of birds and semiaquatic mammals produce cercariae that are capable of penetrating human skin but cannot develop into adults. Humans may present with dermatitis which is frequently more severe than the dermatitis produced by human schistosomes.





Adult Male & Female: The female worm (arrows) resides in the gynecophoral groove of the male. Note the long, narrow shape, ideal for living in veins. They are approximately 8 mm in length.

Egg: *Schistosoma haematobium* eggs are passed in the urine and have a prominent terminal spine (arrow). They measure approximately 150 um in length.

Egg: *Schistosoma mansoni* eggs are passed in the feces and have a large, lateral spine (arrow). They measure approximately 150 um in length.

Egg: *Schistosoma japonicum* eggs are passed in the feces and have a vestigial, nubby lateral spine (arrow). They are also more rounded than the other 2 species and measure approximately 100 um in length.

Differences between schistosomes

feature	*S.haematobium*	*S.mansoni*	*S.japonicum*
egg	Terminal spine	Lateral spine	Lateral knob
Definitive host	man	man	Man and domestic animal
Intermediate host	Bulinus	biomphalaria	Oncomelania
ovary	Behind the middle of the body contain 20 -30 eggs	Anterior to the middle of the body contain 1-3 eggs	In the middle of the body contain 50 or more eggs
No. of egg passed/day	300egg	350 egg	3000 egg
Testis	4-5 in group	8-9 in zigzag row	6-7 in single file
Location	vesical and pelvic venous plexuses	Inferior mesenteric vein	superior mesenteric vein