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المطلوبة

Objectives

Fasciola

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1. Overview on fascioliasis.
2. Geographical distribution.
3. Morphology of *Fasciola gigantica*.
4. Life cycle.
5. Pathogenicity & clinical picture.
6. Diagnosis of fascioliasis.
7. Treatment of fascioliasis.
8. Prevention and control.
9. Difference between *F. gigantica* & *F. hepatica*.

Overview

- *Fasciola* is parasitic flatworm of class Trematoda.
- It infects biliary tract of various mammals, including humans.
- *Fasciola gigantica*, known as common liver fluke or large liver fluke.
- *Fasciola hepatica*, known as sheep liver fluke.
- The disease caused by the flukes is called fascioliasis.
- It causes great economic losses in cattle and sheep.

Fasciola gigantica

Geographical distribution:

Worldwide, including EGYPT, Africa and far East.

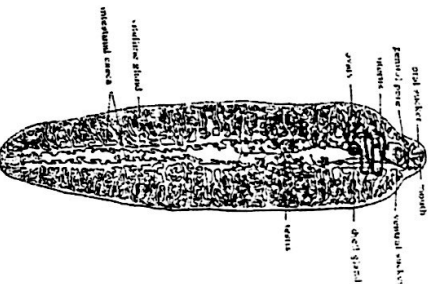


3) Suckers: oral sucker and large ventral sucker.

4) Digestive system: intestinal caeca with lateral compound branches and medial T or Y-shaped ones.

5) Genital system:

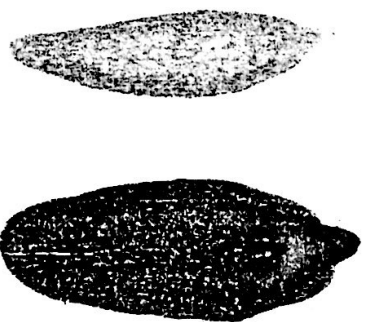
- Testes: two highly branched.
- Ovary: branched in front of testes.
- Uterus: short and convoluted.
- Vitelline glands: highly branched along the lateral fields.



Adult morphology:

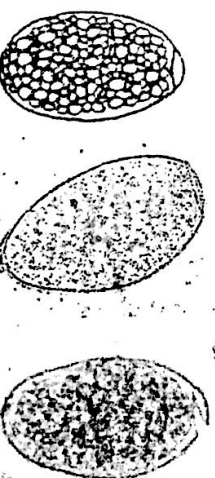
1) Large fleshy leaf-like worm, 3-7 x 1 cm.

2) Body formed of small cephalic cone, shoulders with parallel borders and posterior round end.



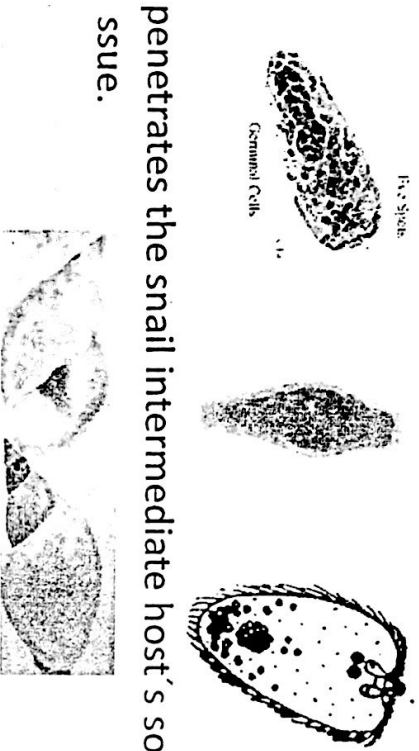
Egg:

- Size: 140 x 70 μ .
 - Shape: oval.
 - Shell: thin.
 - Colour: light yellowish brown (**bile stained**).
 - Contents: **immature** (ovum & yolk cells).
 - Special character: **operculated**.
- Eggs discharged with feces of infected host, in fresh water of canals, drains and River Nile, hatch within 2 weeks into miracidium.



Miracidium:

-A phototrophic pyriform ciliated organism that can swim in water but cannot feed.



-It penetrates the snail intermediate host's tissue.

Redia: cylindrical larva with germ cells from which cercariae arise and leave through the birth pore.



Sporocyst:

-Simple elongated sac.

-Body cavity with germ cells that proliferate giving daughter sporocysts or rediae.



Cercaria:

-Leptocercous cercaria formed of a body (0.3 mm) and a simple tail (0.7 mm).

-Body with 2 suckers, primitive gut, flame cells, and cystogenous glands that secrete cyst wall.

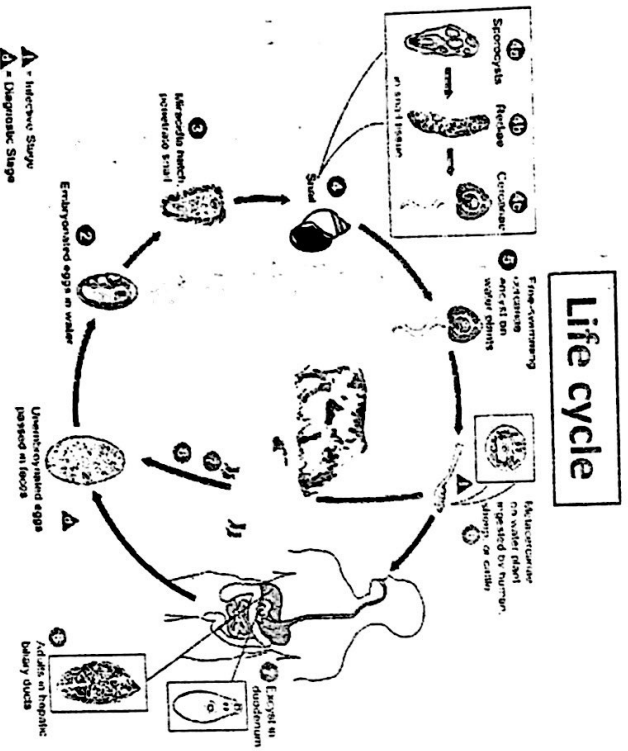
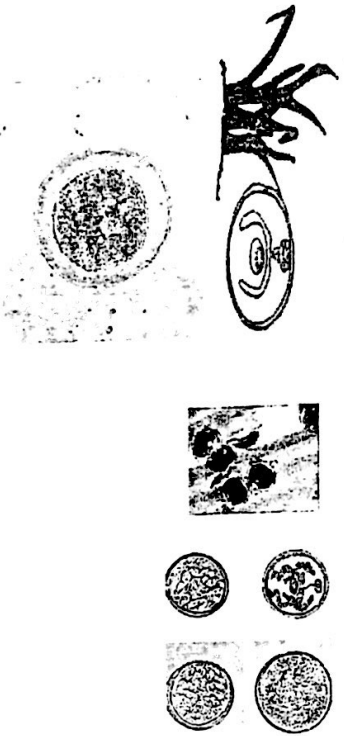
-Cercaria moves in water, attaches to aquatic vegetation, loses its tail and encysts → encysted metacercaria.



Encysted metacercariae:

- Spherical, 0.25 mm in diameter.
- Thick white or brown cyst walls, contain suckers and primi ve gut.

-They can keep alive in water for 6-10 months.



Life cycle:

Habitat: bile ducts and gall bladder.

Definitive host: man.

Intermediate host: snail, *Lymnaea cailliaudi*.



Reservoir hosts: herbivorous animals as cattle, buffalo, camels, sheep, and goat.



Infective stage: encysted metacercariae in water and on water vegetables.

Stages in life cycle: egg → miracidium → sporocyst → redia → cercaria → encysted metacercaria → adult.

Mode of infection:

✓ Eating raw vegetables or vegetables previously washed in infected water.

✓ Drinking infected water, polluted by encysted metacercariae, 6-12 hours after encystation.

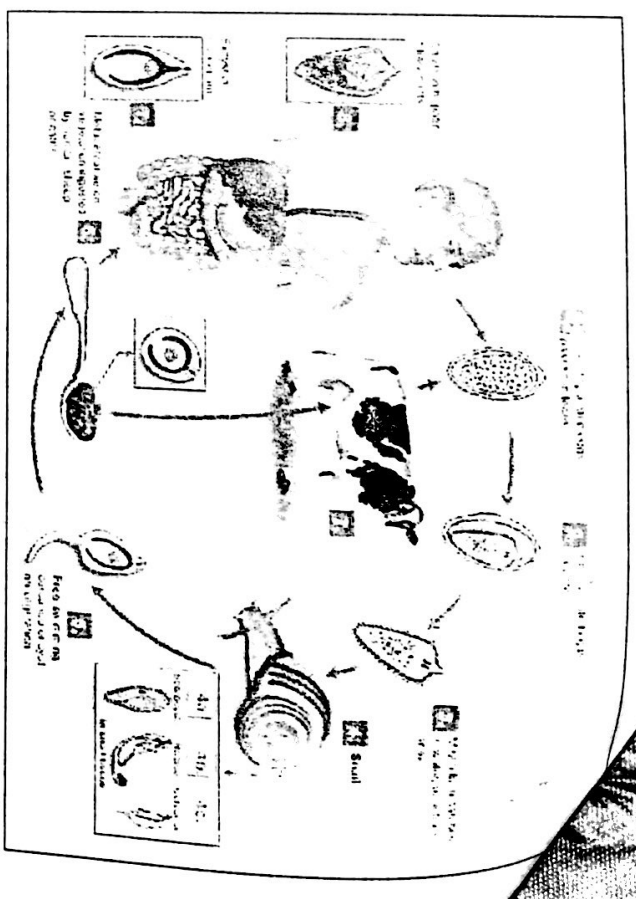
- In the duodenum, the cyst wall dissolves and the metacercariae penetrate the wall of the intestine → peritoneal cavity.

- Metacercariae pass to the liver through its capsule and pass through the liver tissue → normal habitat in the bile duct.
- They settle and mature to adults in about two months after infection.
- Eggs appear in the stool 3-4 months after infection.

Pathogenicity:

Disease: fascioliasis.

- 1-Abdominal pain due to penetration of intestinal wall.
- 2-Peritonitis: occurs by penetration of intestinal wall and the presence of metacercariae in the peritoneal cavity.
- 3- Liver rot: occurs by mechanical and toxic destruction of liver tissue by passage of immature worms → necrosis, fibrosis, hepatitis, and hepatomegaly.



Hypertrophy of bile ducts in liver caused by *Fasciola*.

Liver rot



4- **Obstructive jaundice:** adults in the bile duct
→ irrita on, thickening of the duct and stone forma on → obstructive jaundice and cholangi s.

5- Allergy and eosinophilia.

6- **Ectopic fascioliasis:** when metacercariae enter the circula on and are distributed in abnormal sites e.g. peritoneum, lungs, brain, eyes and cause brosis.

Clinical picture:

1- Irregular fever.

2- Digestive disturbances: nausea, vomiting, diarrhea, biliary colic & obstructive jaundice.

3- Pain in the upper right hypochondrium with enlarged tender liver.

4- Anemia and high eosinophilia.

✓ The triad of fever, hepatomegaly, and eosinophilia in endemic area suggests fascioliasis.

7- **False fascioliasis:** due to eating of infected animals liver and passage of eggs in stool.

8- Halazoun:

- In Lebanon, Syria and Armenia where people prefer to eat raw liver.
- The living *Fasciola* adult worm attaches to the mucosa of the pharynx by its suckers.
- Oedematous congestion of the pharynx and larynx → dysphagia and suffocation.

Diagnosis:

I- **Clinical:** fever, hepatomegaly, abdominal pain (clinical triad), with history of green salad consumption.

II- Laboratory:

1. Detection of immature eggs by:

a. Stool examination (ask patient to stop eating liver for 7 days before testing).

b. Examination of duodenal aspirate.



2. Complete blood count for anaemia & eosinophilia (blood eosinophil count >500-1000 / μ l of blood).
3. Serological tests: are of value during migratory or chronic stage and ectopic infection.
- ELISA, IHA and CFT.
4. Sonogram and CT (computerized tomography).

Prevention and control:

- 1-Mass treatment of infected animal reservoir.
- 2-Snail destruction.
- 3-Proper washing or cooking of aquatic vegetables.
- Immerse raw vegetables in water + few drops of potassium permanganate for 20 min, or in 5 parts water + 1.5 parts vinegar for 5 min.
- 4-Sanitary disposal of stool.
- 5-Boiling or filtration of polluted water.
- 6-Health education & treatment of infected cases.

Treatment:

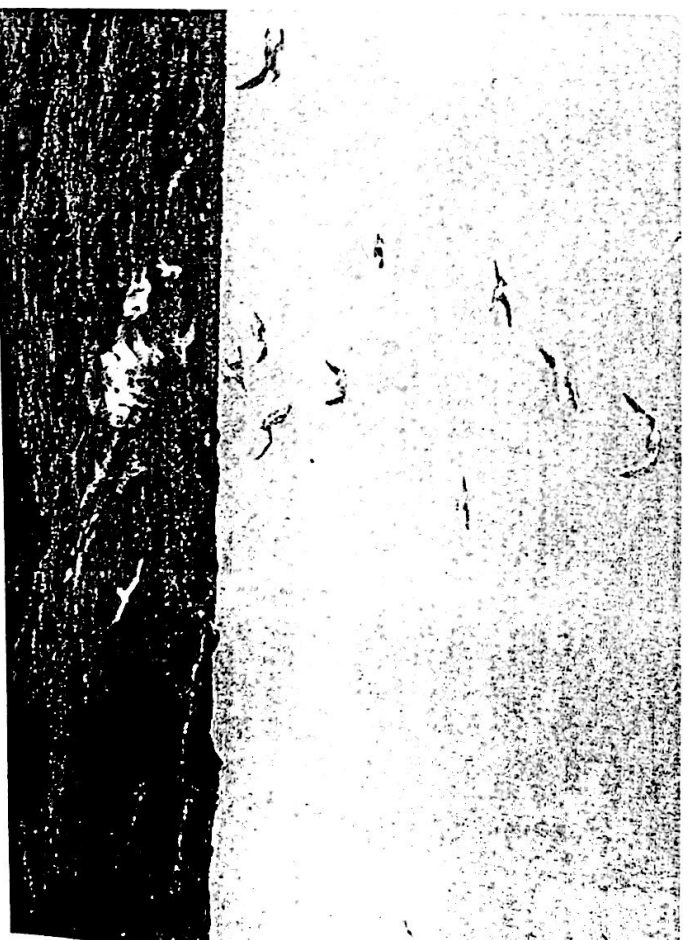
1-Triclabendazole (Fasinex): drug of choice. It is acting on immature and adult worms.

2-Bithionol (Bithion).

3-Surgical removal of ectopic ulcers.

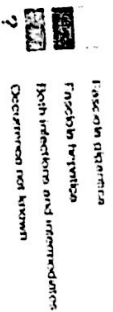
4-Treatment of halzoun:

- a. Gargling with strong alcoholic drink.
- b. Use of emetics.
- c. Picking up of the worm by forceps.
- d. Tracheostomy in situ.

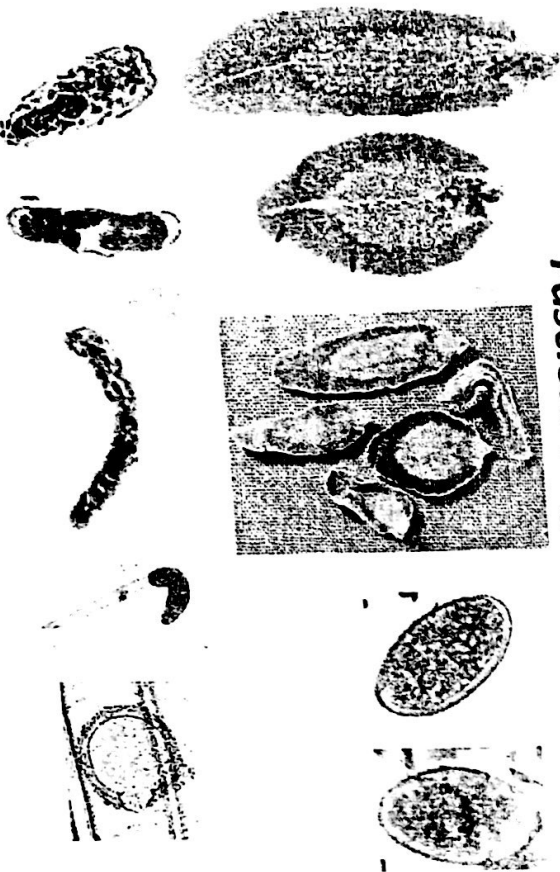


Fasciola hepatica (Sheep liver uke)

Geographical distribution: it is common in sheep raising countries (Europe), detected in Egypt.



Fasciola stages



	<i>F. gigantica</i>	<i>F. hepatica</i>
Length	3-7 x 1 cm	2-3 x 1.3 cm
Cephalic cone	smaller	larger
Lateral sides	parallel	converging
Inner intestinal branches	T and Y-shaped	rudimentary
Suckers	Ventral larger than oral	equal
Snail	<i>L. collicaudi</i>	<i>L. truncatula</i> , <i>L. columella</i>
R.H.	mainly cattle, buffalo	sheep



Pathogenicity:

- Adult worm can live in sheep for 5 years and cause liver cirrhosis and ascites.
- In man: young adults burrow through the liver tissue feeding on its cells → in ammonia, necrosis (liver rot) and marked eosinophilia.
- The other pathological findings are similar to *F. gigantica*.

Clinical picture:

- Fever, and general malaise.
- Pain in the right hypochondrium.
- In heavy infec on enlarged tender liver.

Diagnosis, treatment, preven on and control are similar to those of *F. gigantica*.

