



*Paragonimus westermani*  
(Lung Fluke)  
Class: Trematoda

**By**

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# 5 REASONS NOT TO EAT CRUSTACEANS



# *Paragonimus westermani* (Oriental lung fluke)



## ❖ Geographical distribution :

Endemic in the far East of Asia  
(Japan, Korea, China, Philippines)  
and Central & South America.

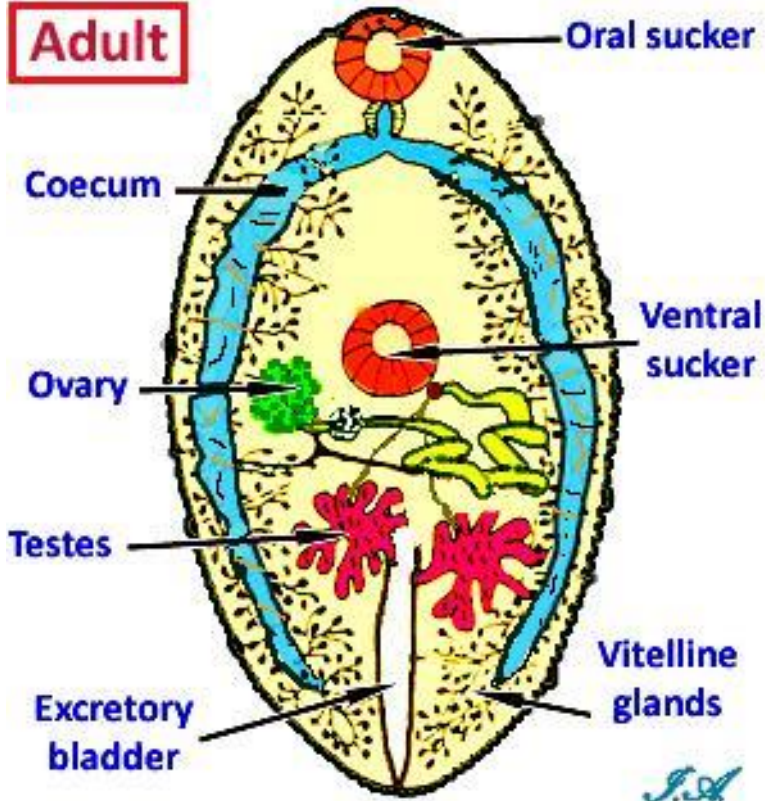
❖ **Habitat** : Lung in cyst like pockets.



# Morphology

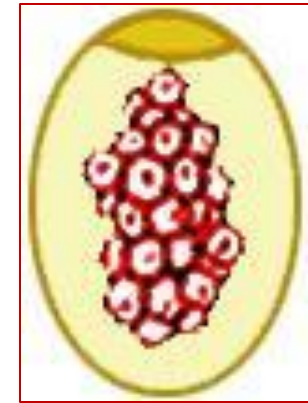


**Adult**



**Size: 12 × 6 mm**

**Egg (D.S)**



**Size : 90 x 50 μm.**

**Shape : Oval.**

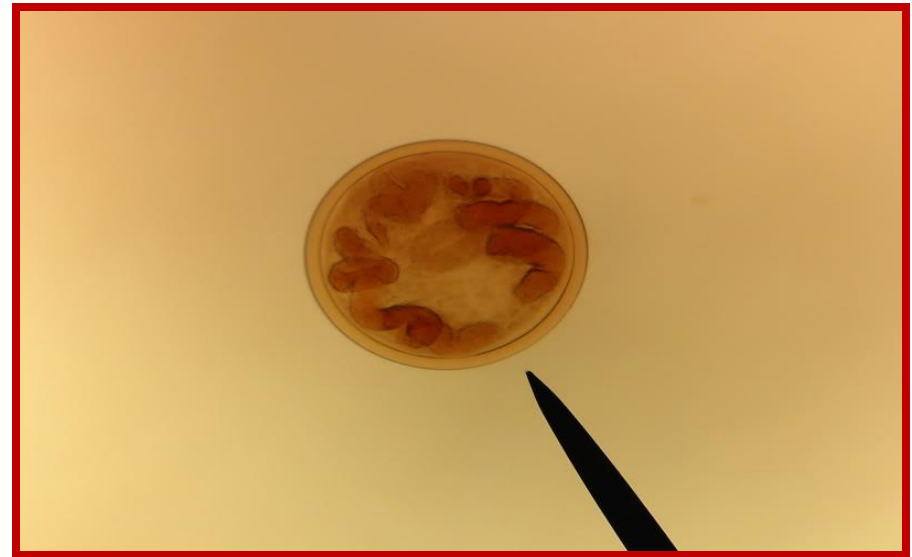
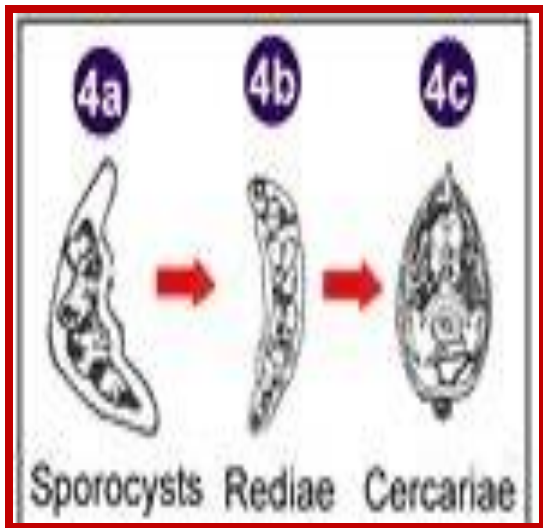
**Shell : Thick shell with operculum .**

**Color : Golden brown.**

**Content : Immature ovum.**



*Semisulcospira libertina*  
snail

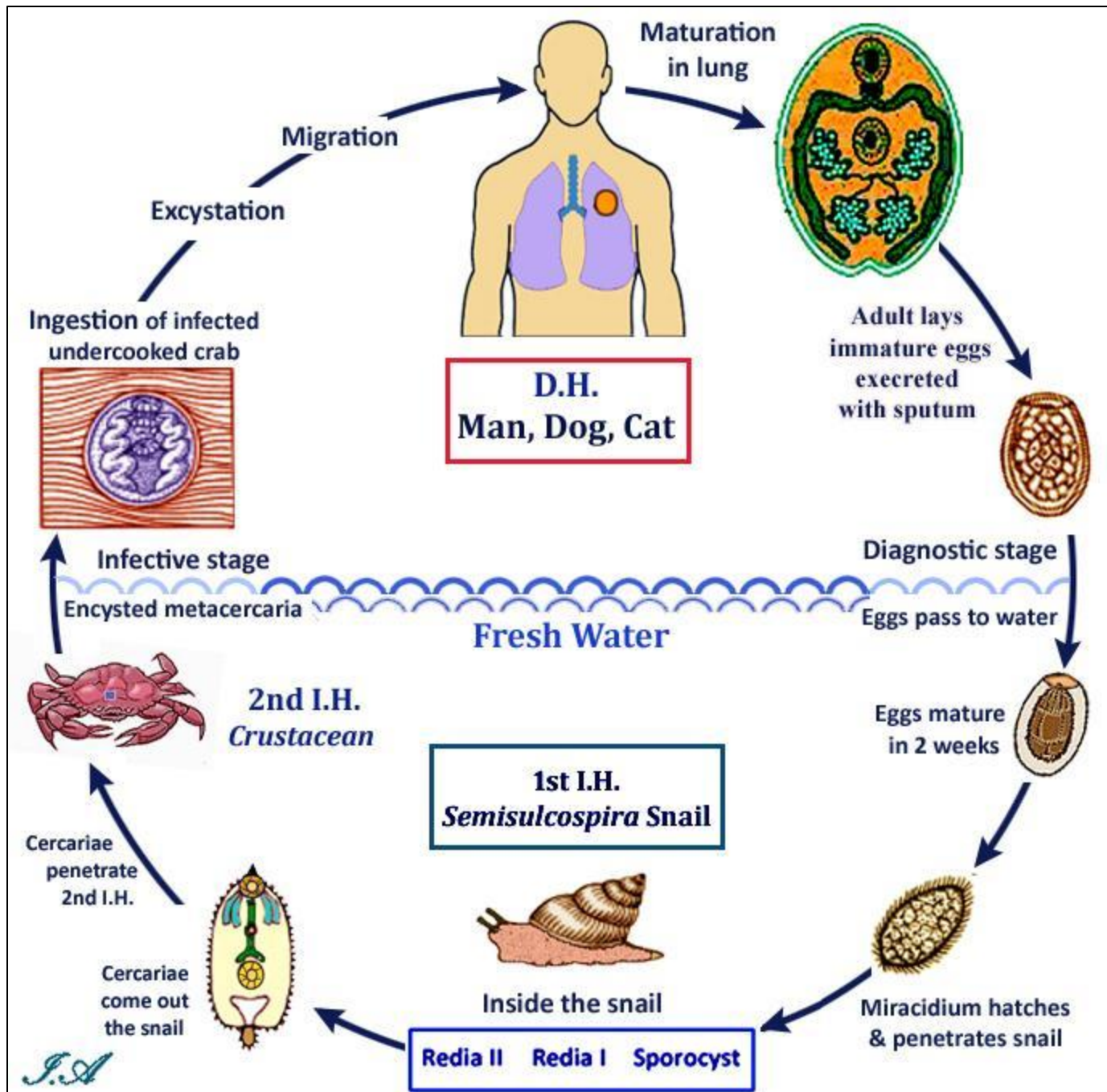


Encysted metacercaria ( I.S)



Microcercous cercaria  
with knob-like tail





1) **Adult flukes** live in cysts in the lungs and lay eggs which are discharged into the bronchioles and coughed out with sputum. If the sputum is swallowed, the eggs may pass out with faeces.

2) **In fresh water**, a miracidium develops and hatches after two to three weeks, penetrates the 1st I.H snail and develops into sporocyst, redia and finally microcercous cercariae which penetrate the 2nd I.H and become encysted metacercariae in the muscles and gills.

3) **D.H. infection** by ingestion of infected raw or undercooked crabs and crayfish. Metacercariae are released in the intestine , penetrate the intestinal wall, the diaphragm, the pleural cavity and finally lung tissues where they mature to adult.

# Life cycle



❖ **D.H** : Man

❖ **R.H**: fish eating animals & carnivorous.

❖ **I.H**: • 1<sup>st</sup>: Fresh water snail (*Semisulcospira libertina*).

• 2<sup>nd</sup>: Fresh water cray fish or crabs.

❖ **Mode of infection**: Infection occurs by eating raw or undercooked crabs or cray fish containing encysted metacercaria (**I.S**)



# Pathogenesis & Symptomatology



## Diseases : Paragonimiasis

Adult worms live in lung and stimulate granulomatous tissue → fibrous capsule surrounding worms and eggs forming cyst containing blood tinged fluid.

Rupture of the cyst into bronchioles causes pulmonary symptoms such as fever, chest pain and cough with rusty sputum (blood tinged with eggs) ⇒ endemic haemoptysis.  
Chronic cases resemble pulmonary tuberculosis.

### Complications:

**Pulmonary** : pneumonia, bronchitis, lung abscess & pneumo-thorax and pleural effusion.

**CNS** : seizures, coma , paralysis.

**GIT**: abdominal pain & diarrhea.

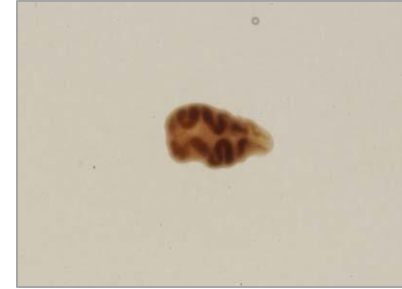
**Skin**: migratory allergic skin lesions.

# Laboratory Diagnosis



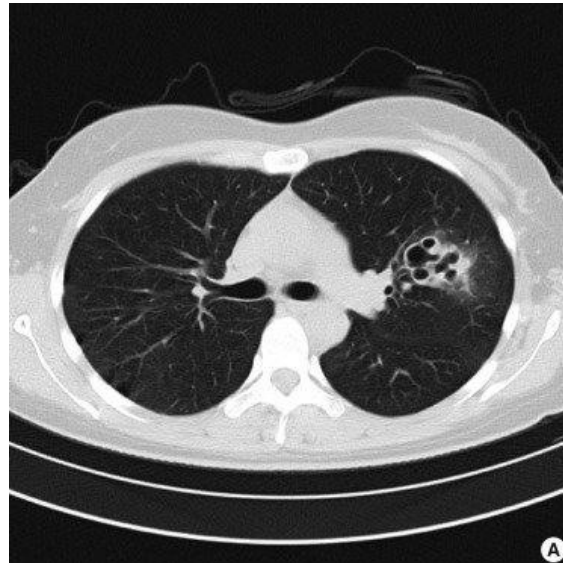
## Direct

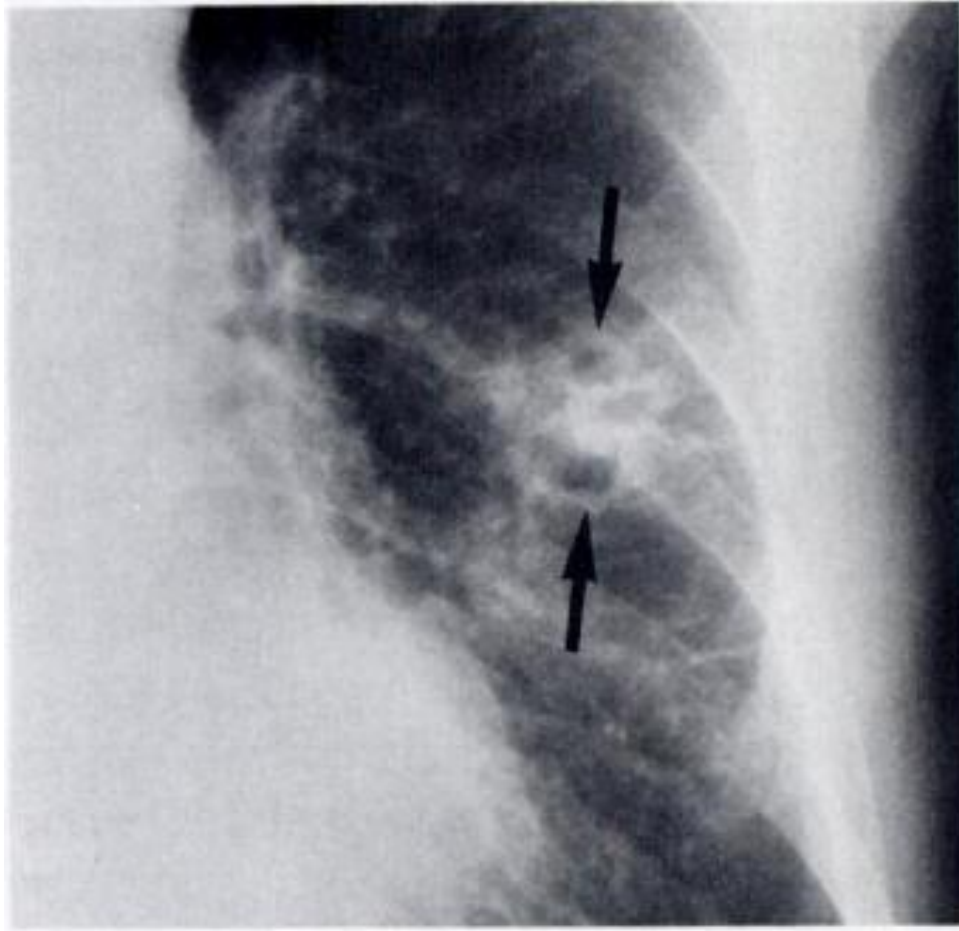
- Detection of eggs & sometimes adult in rusty sputum.
- Detection of eggs in stool.



## Indirect

- Serological tests: CFT and ELISA
- High eosinophilia.
- Chest X ray & CT : ring shadow opacity comprising several small contiguous cavities resembling bunch of grapes.





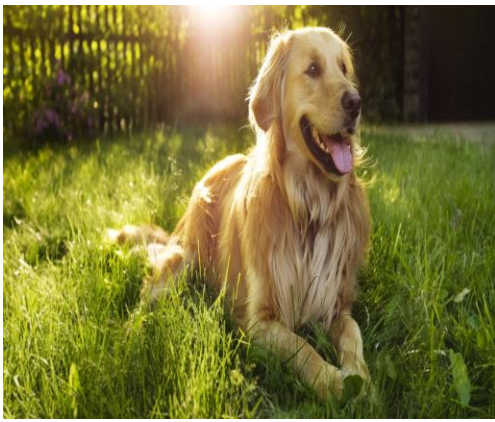
**X ray showing ring shadow opacity of *Paragonimus westermani* infection**

# Treatment

## 1- Praziquantel is the drug of choice



Identify ??????



# *Echinococcus granulosus*

Class: Cestoda

**(Hydatid worm)**

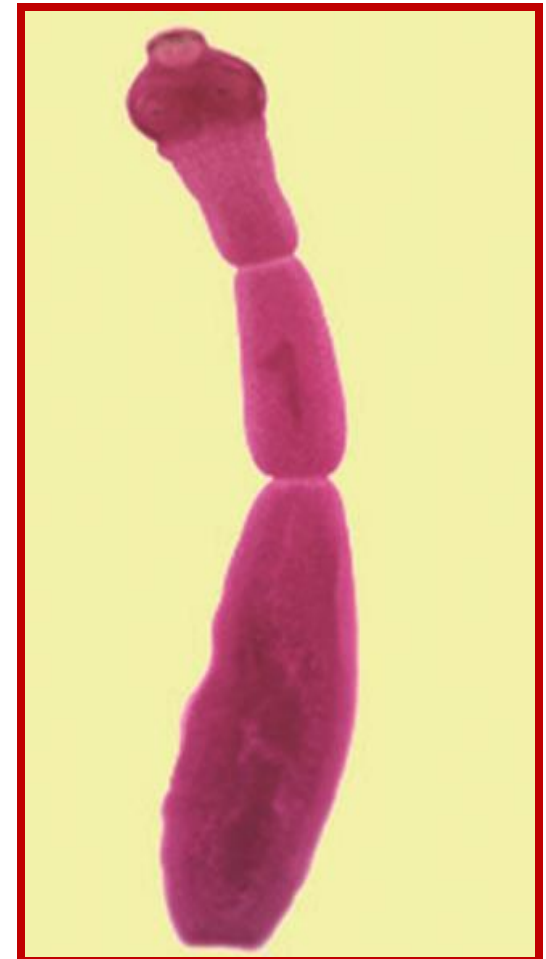
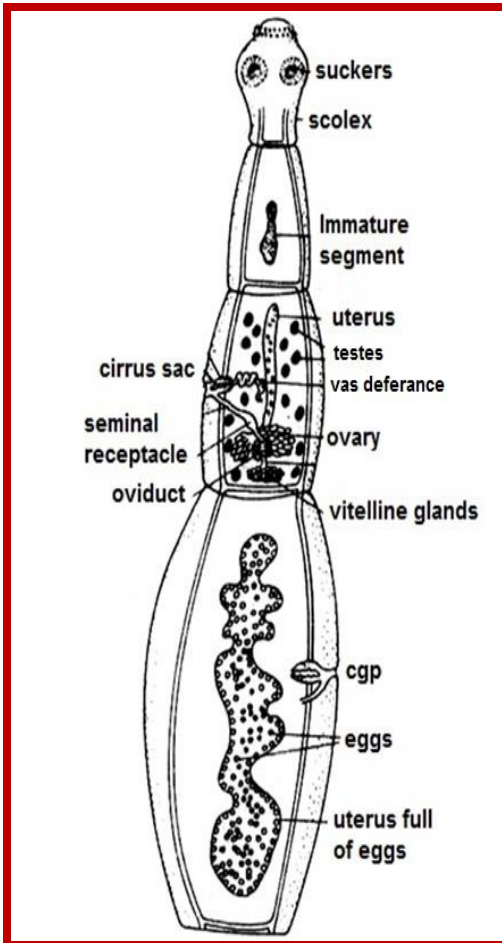




# ***Echinococcus granulosus***

- **Geographical distribution : Cosmopolitan.**
  - **Habitat: Small intestine of the D.H.**
  - **D.H: Dogs, foxes and other canines.**
  - **I.H: Sheep, cattle, pigs and occasionally man.**
-

# 1- Adult worm of *E. granulosis*



## 2-Egg of *E. granulosus*

**(I.S to man & herbivorous).**

**Size:** 30-40 um.

**Shape:** Spherical.

**Shell:** Thick, radially striated embryophore.

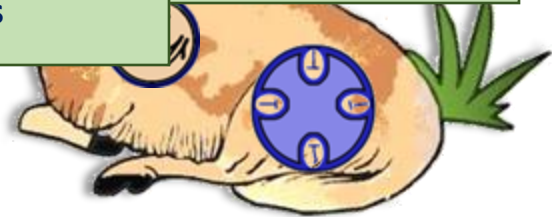
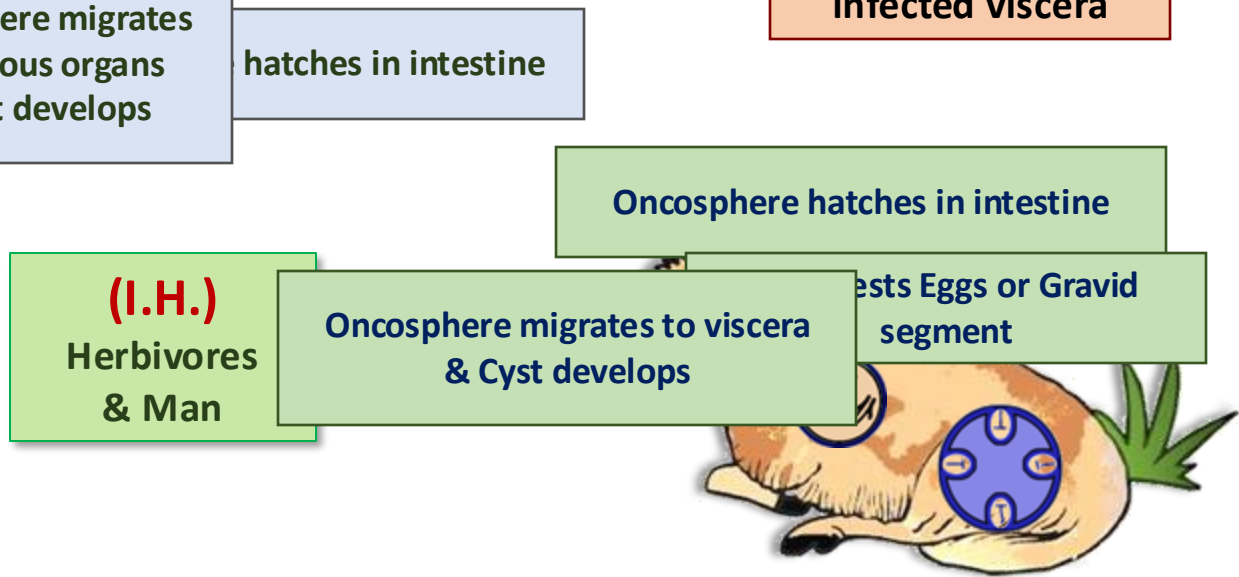
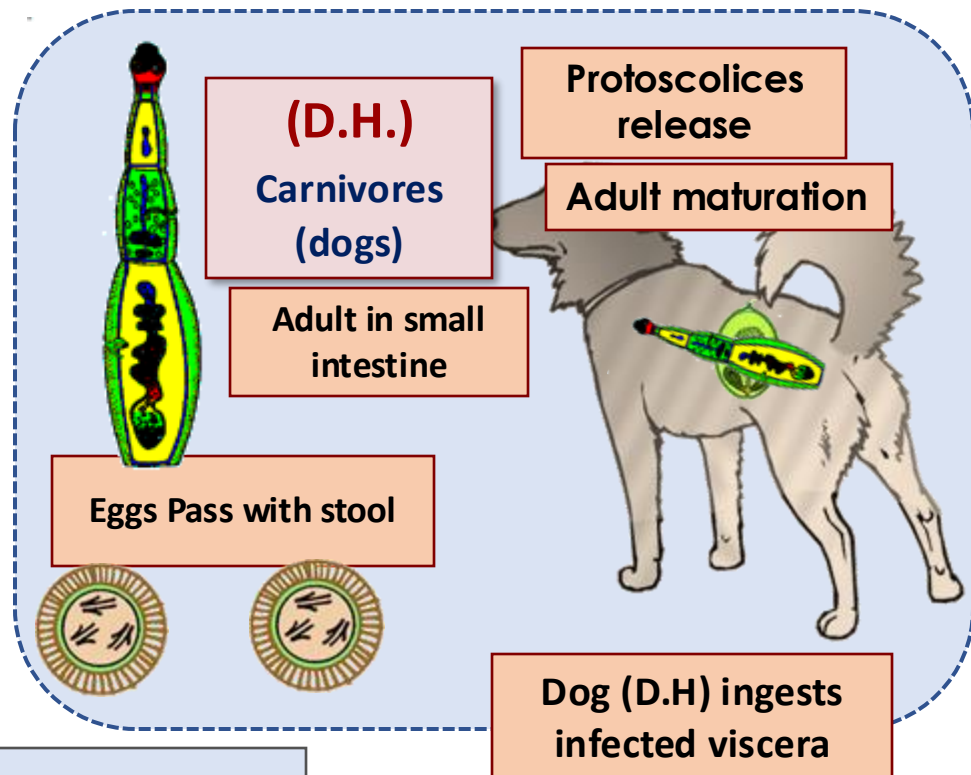
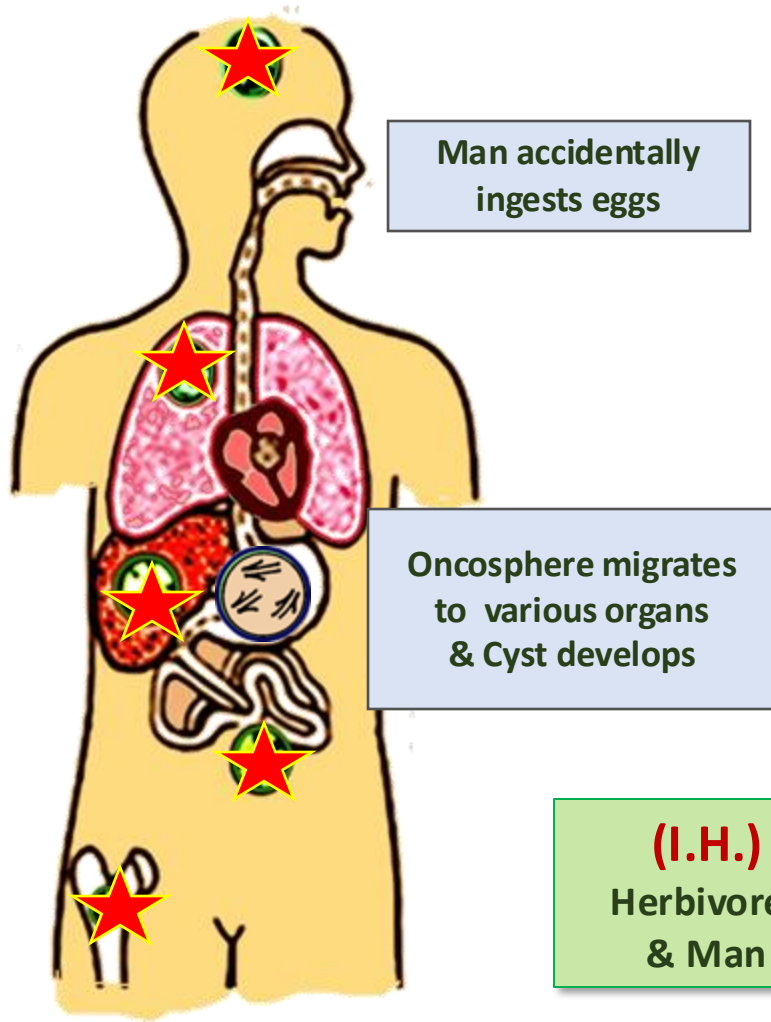
**Color:** brownish.

**Content:** Mature hexacanth embryo

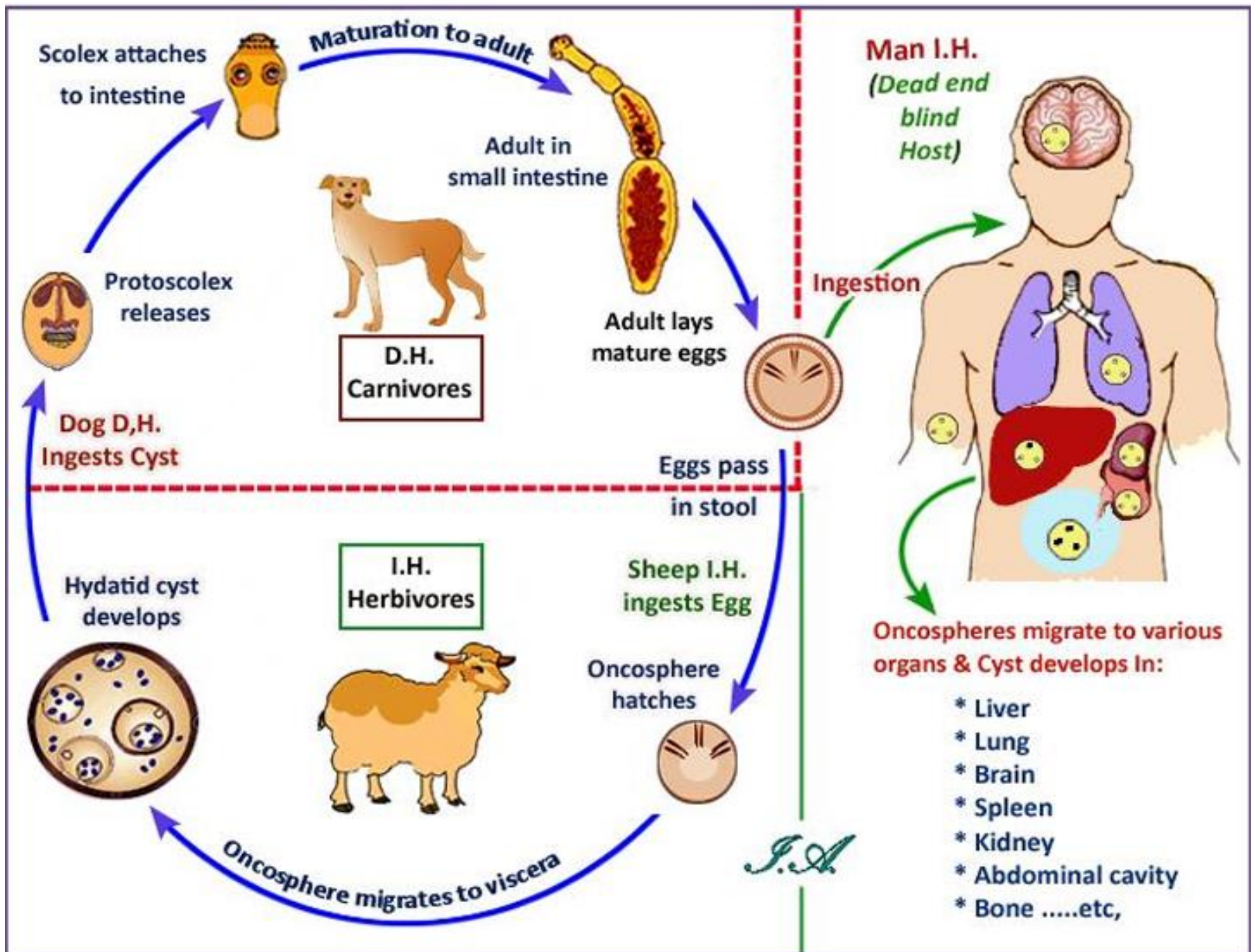
**(onchosphere)**



# Life Cycle of *Echinococcus granulosus*



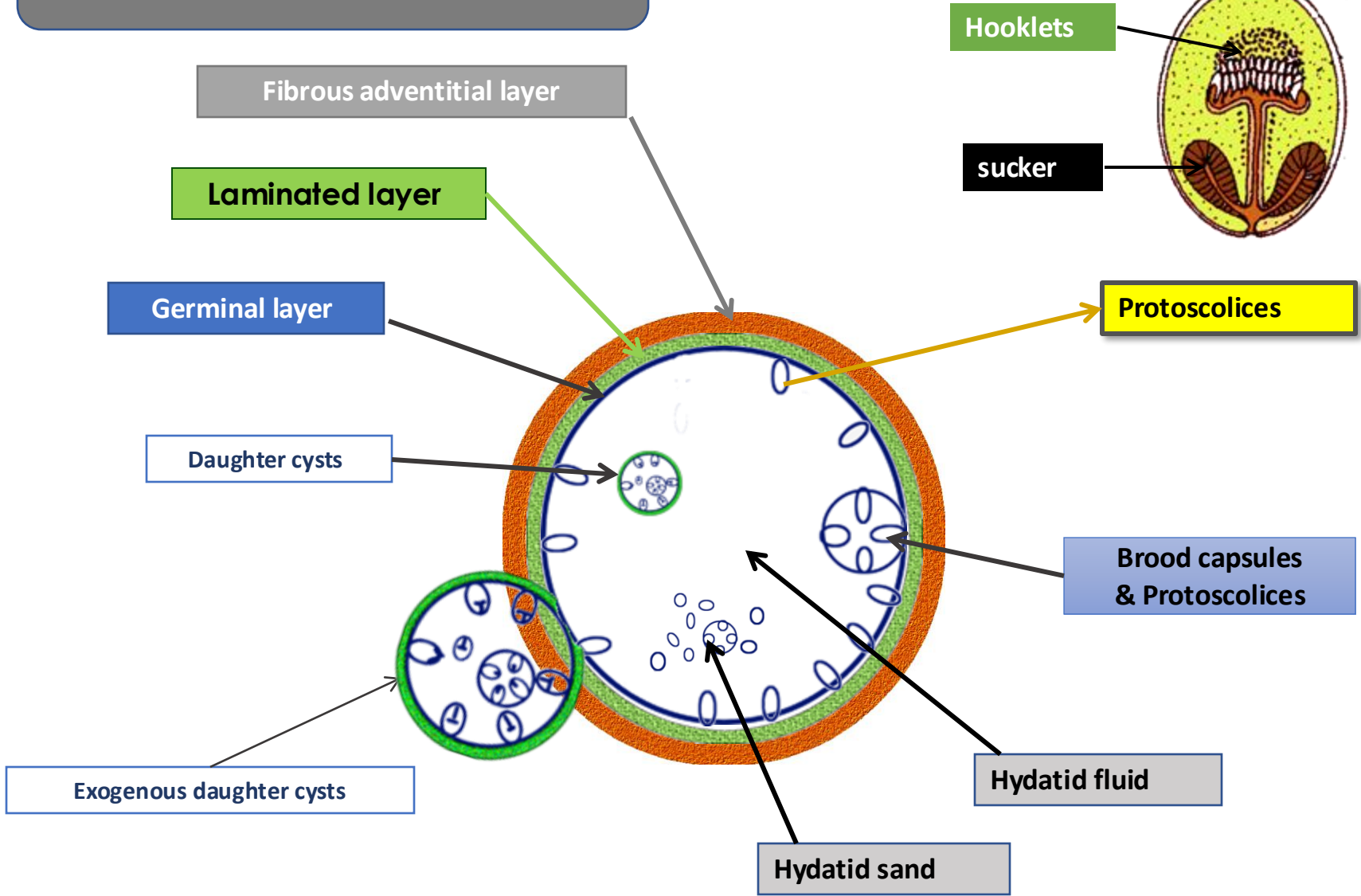








# Unilocular hydatid cyst



# Hydatid cyst

**(D.S in man and herbivorous & I.S to DH):**

- **Simple unilocular hydatid cyst:-**
- **The most common type.**
- **Size :** Variable from pin's head to head of the foetus (1 mm - 20 cm).
- **Shape :** More or less spherical.





## Hydatid cyst disease (Cystic Echinococcosis or Hydatidosis)

- ❖ It is a parasitic infection of both humans and other mammals such as sheep, and cattle with hydatid cysts, the larval stage of *Echinococcus granulosus*.
- ❖ Man is an intermediate and blind host for *Echinococcus granulosus*
- ❖ Infection occurs by Ingestion of eggs with food or drinks contaminated with dogs' faeces or by handling dogs whose hair are usually contaminated with eggs.

# Pathogenesis & Symptomatology



**Local inflammatory reaction** around the hydatid cyst, ending in formation of a fibrous capsule which may become calcified or even ossified.

**The symptoms** depend on the size & site of the cyst.

Large sized cysts  $\Rightarrow$  pressure atrophy of affected organs:-  
**Liver (70%)**  $\Rightarrow$  enlargement and dysfunction (fever, pain and jaundice).

**Lung (20%)**  $\Rightarrow$  pain, cough and dyspnea.

**Brain**  $\Rightarrow$  epilepsy.

**Eye**  $\Rightarrow$  protrusion of the eye ball.

**Bones**  $\Rightarrow$  Pain & spontaneous fracture.

**Kidney**  $\Rightarrow$  membranous nephropathy.

**Spontaneous rupture of cyst** into peritoneal cavity or pleura may lead to severe allergic reaction (anaphylactic shock) or secondary cysts.

# Pulmonary Cystic Echinococcosis



- Common in children than adult.
- **Clinical picture:**
  - ❑ **Mainly asymptomatic** until the cyst enlarges to cause symptoms.
  - ❑ **Complication** occurs as a result of cyst enlargement & its rupture. **It presented by:**
    1. Cough.
    2. Chest pain.
    3. Dyspnea.
    4. Haemoptysis.
    5. Pneumothorax, pleural effusion & pulmonary abscess.





# Diagnosis

## Clinical

- History of contact with dogs.
- Slowly growing cystic tumour.
- Hydatid thrill.

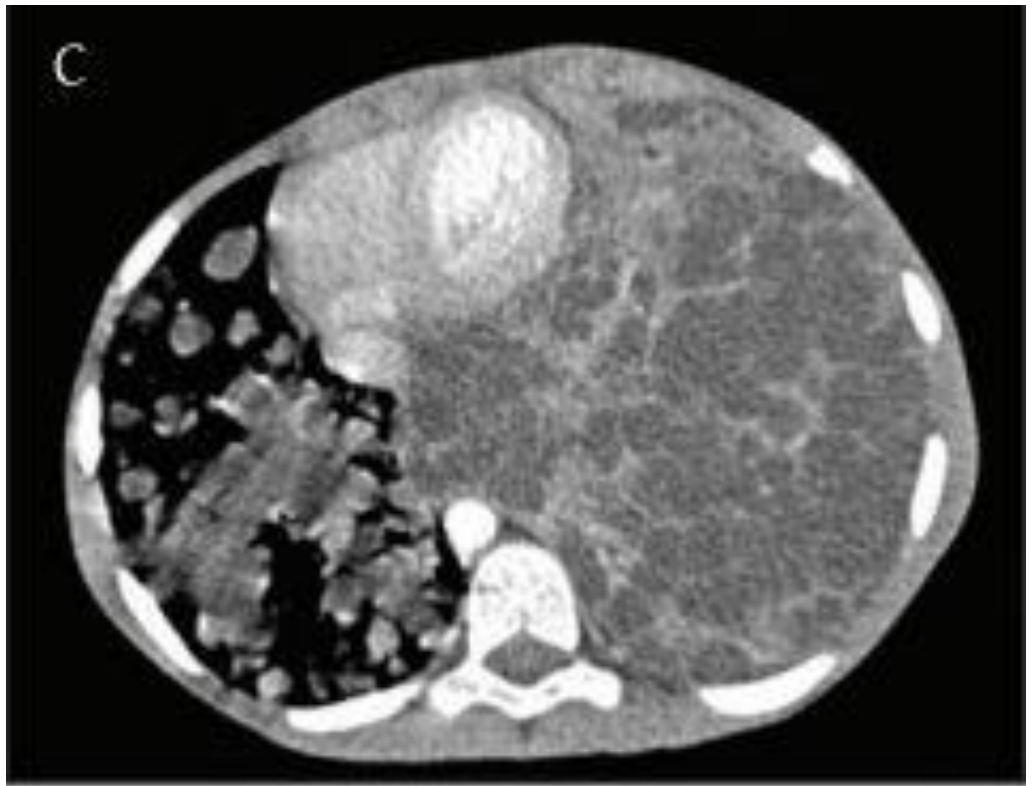
## Laboratory

### Direct

- X-ray for calcified cyst.
- Ultrasonography, CT scan and MRI.
- Scolices in sputum or urine due to rupture of the cyst in bronchus or urinary tract.
- Puncture or aspiration of hydatid fluid
  - ⊖ may lead to anaphylactic shock due to leakage of the fluid.

### Indirect

- Eosinophilia.
- Intradermal test (**Casoni test**).
- Serological tests.
- PCR





# Treatment

- 1) **Surgical removal of the cyst:** The most efficient treatment but it may cause mortality (2%) and recurrence of the disease (2 - 25%).
- 2) **Percutaneous treatment (PAIR): In three steps:**
  - Puncture (P) and needle aspiration (A) of the cyst.
  - Injection (I) of a scolicidal solution usually hypertonic sodium chloride solution or ethanol and left for 5 - 30 minutes.
  - Cyst-re-aspiration (R) and final washing.
    - ✓ This procedure is indicated in **inoperable cases** and who have **drug resistance** (no response to medical treatment).



### 3) **Medical treatment:**

**Indications: In inoperable cases and before and after surgery.**

- **Albendazole (Drug of choice).**
- **Mebendazole.**
- **The combination of ABZ and Praziquantel (PZQ) may provide synergistic effect and better efficacy.**

**Disadvantages:**

- **It may lead to drug resistance.**
- **It is used for long time in high dose.**





# Case 1



- **10-year-old girl. A pediatric, female patient presented with acute respiratory distress, productive cough, and pleuritic chest pain. The first-line investigations included a biochemical work-up and a chest X-ray.**
- **Lab investigations revealed high eosinophilia**
- **Chest X ray revealed complete opacity of the left lung and multiple round opacities of the right lung**



Thank  
You

