



# Respiratory Module (2023-2024)

## *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.

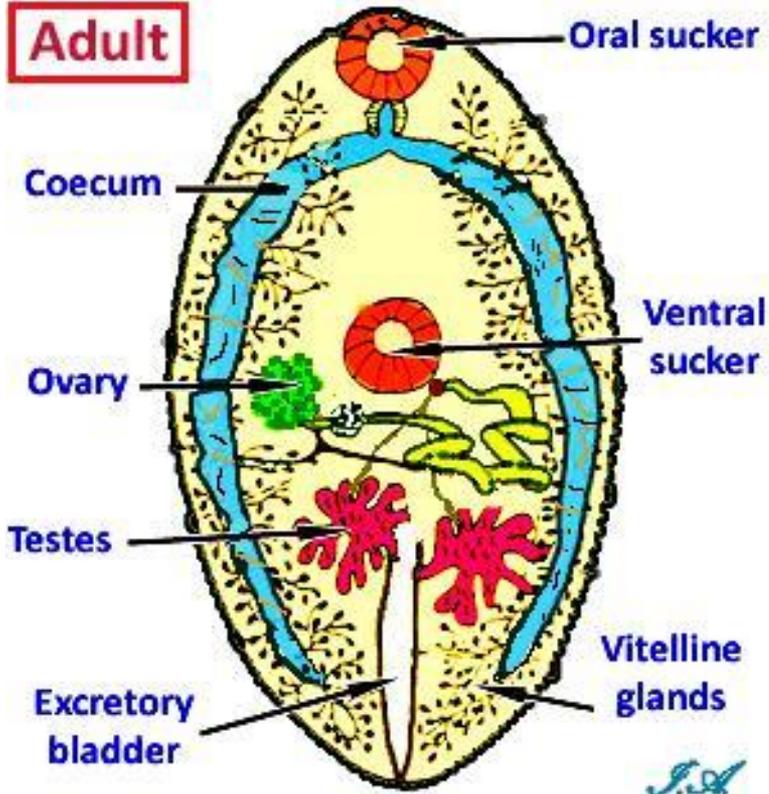
## ❖ Habitat : Lung in cyst like pockets.



# Morphology

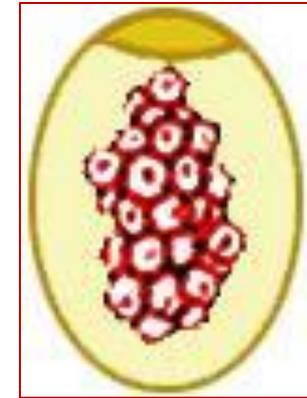


**Adult**



**Size: 12 × 6 mm**

**Egg (D.S)**



**Size : 90 x 50 μm.**

**Shape : Oval.**

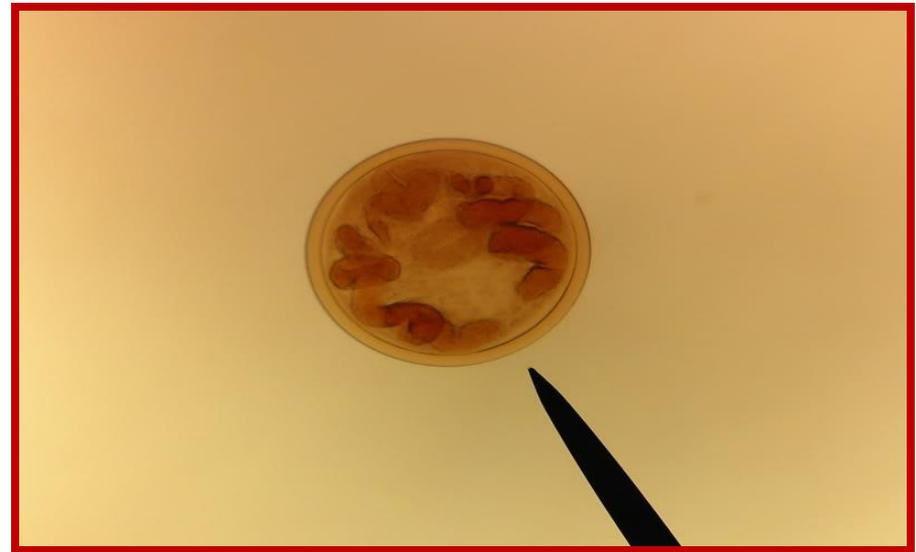
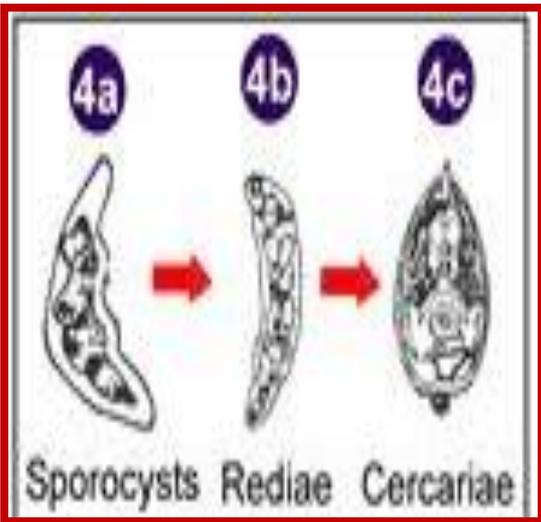
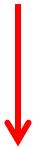
**Shell : Thick shell with operculum .**

**Color : Golden brown.**

**Content : Immature ovum.**



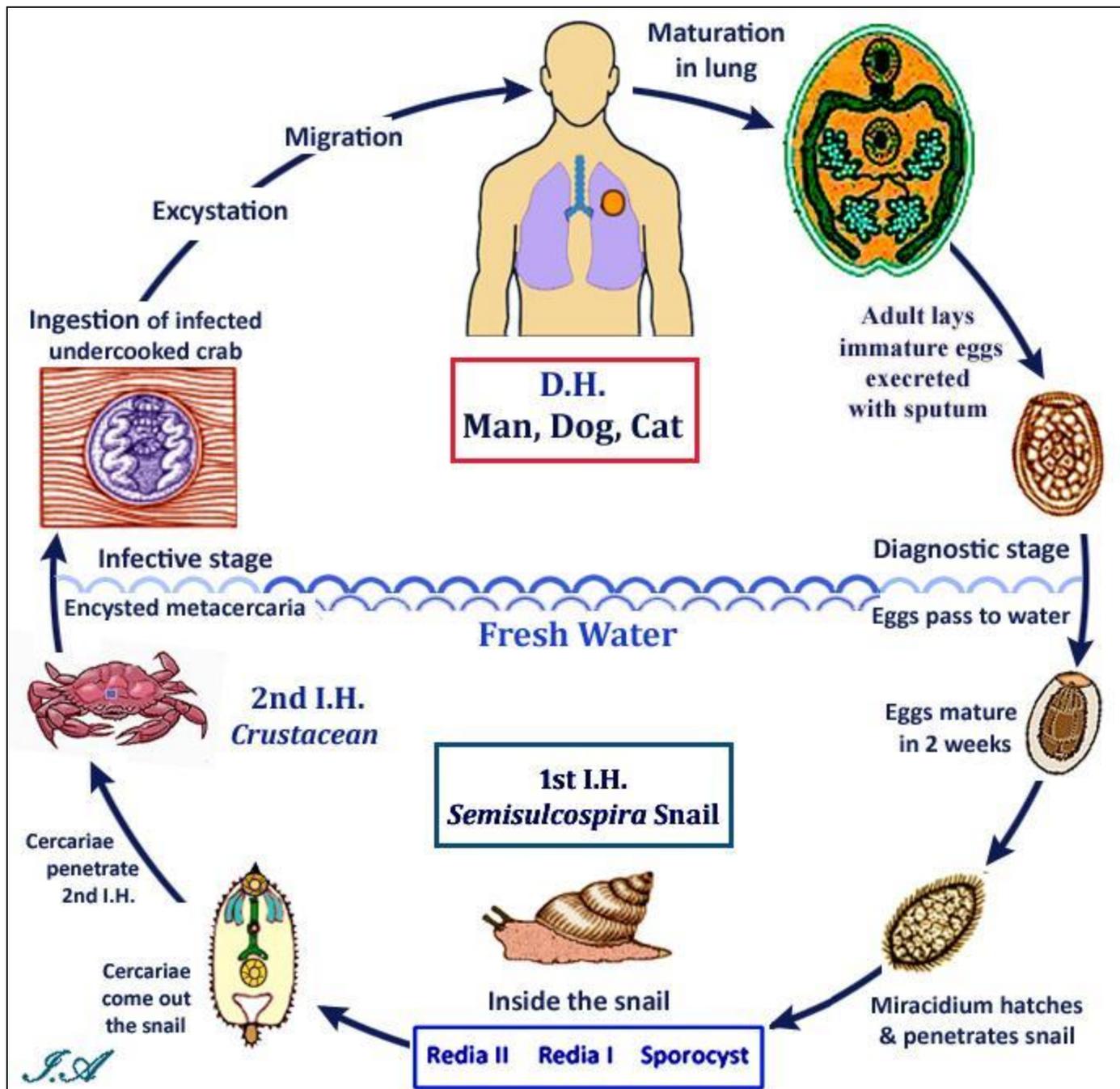
*Semisulcospira libertina*  
snail



Encysted metacercaria ( I.S)



Microcercous cercaria  
with knob-like tail



# 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



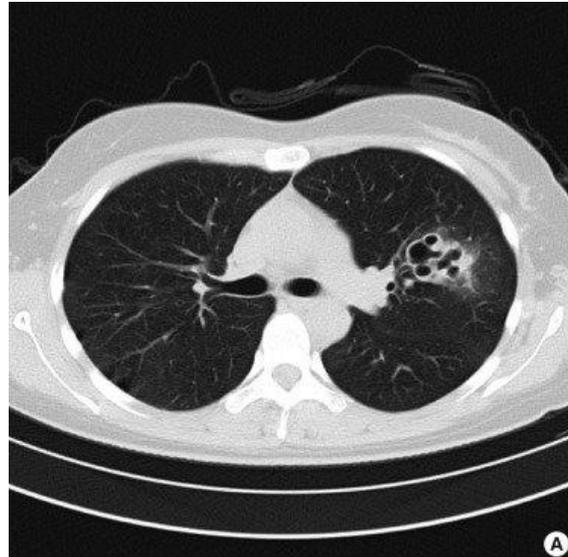
## Direct

- 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.



# Treatment

## 1- Praziquantel is the drug of choice



**Identify ??????**



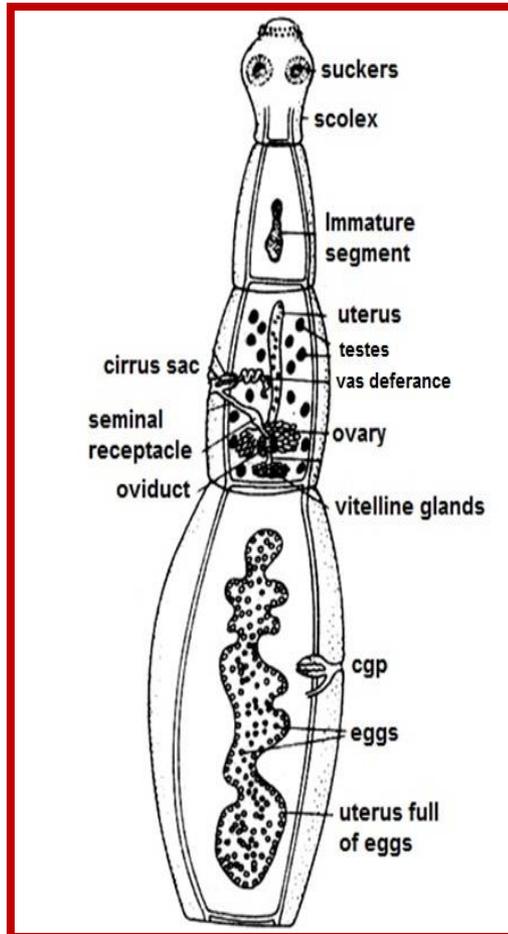
*Echinococcus granulosus*  
Class: Cestoda  
**(Hydatid worm)**



# ***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. granulosis*

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

**Size:** 30-40 um.

**Shape:** Spherical.

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

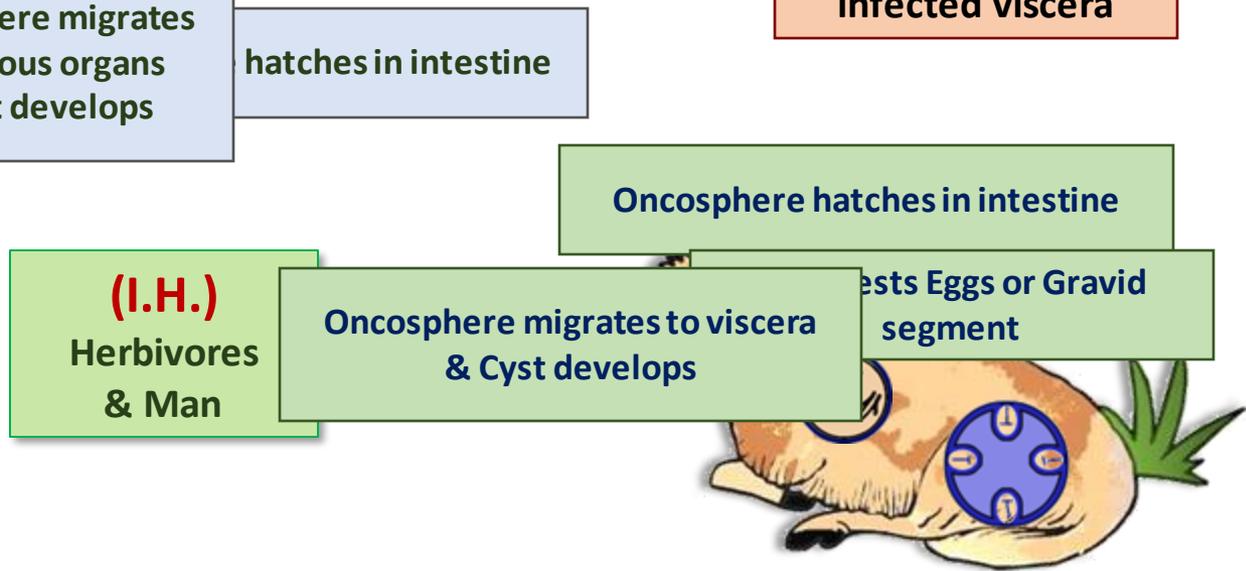
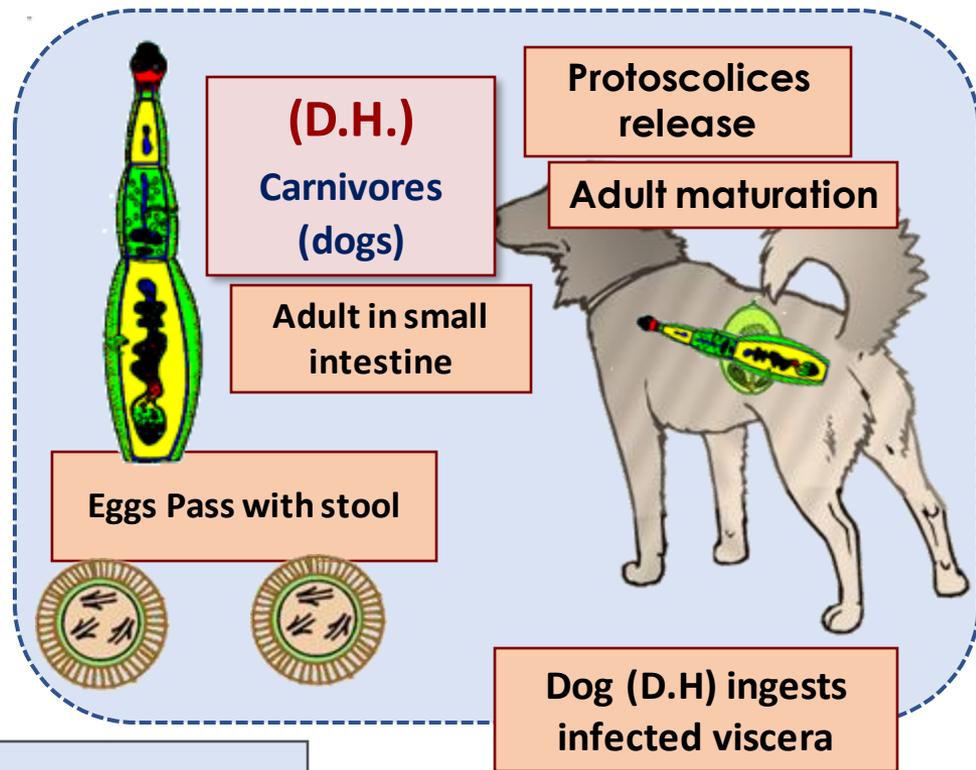
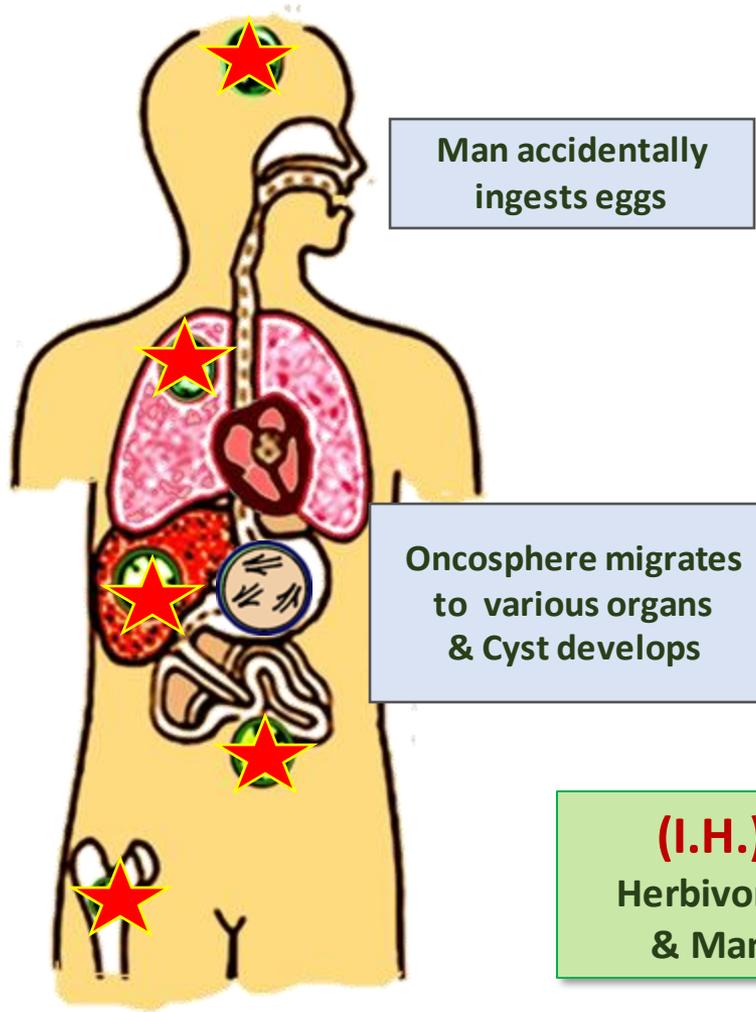
**Color:** brownish.

**Content:** Mature hexacanth embryo

**(onchosphere)**

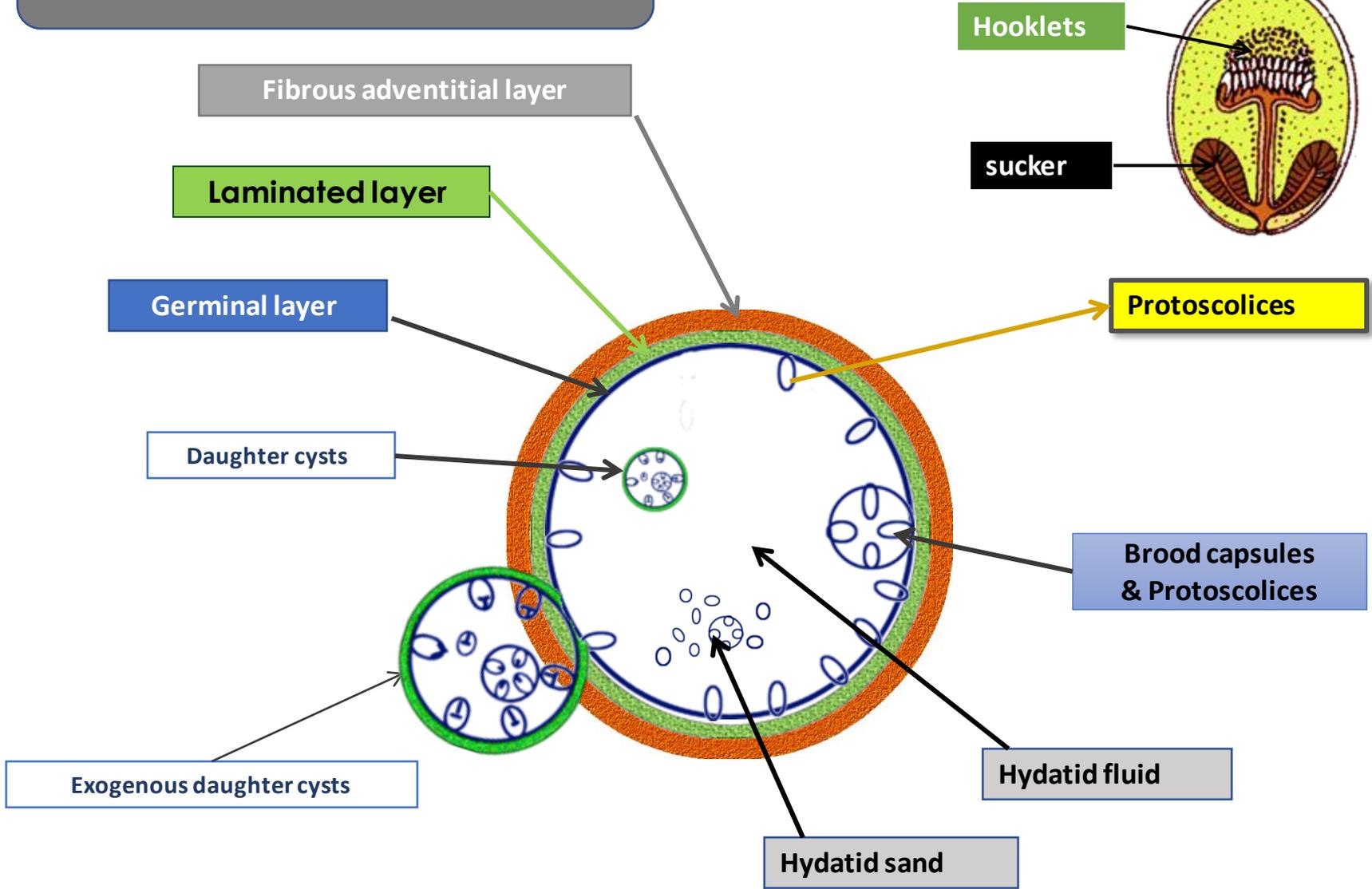


# Life Cycle of *Echinococcus granulosus*





# 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 ⇒ pressure atrophy of affected organs:-  
**Liver (70%)** ⇒ enlargement and dysfunction (fever, pain and jaundice).  
**Lung (20%)** ⇒ pain, cough and dyspnea.  
**Brain** ⇒ epilepsy.  
**Eye** ⇒ protrusion of the eye ball.  
**Bones** ⇒ Pain & spontaneous fracture.  
**Kidney** ⇒ 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.

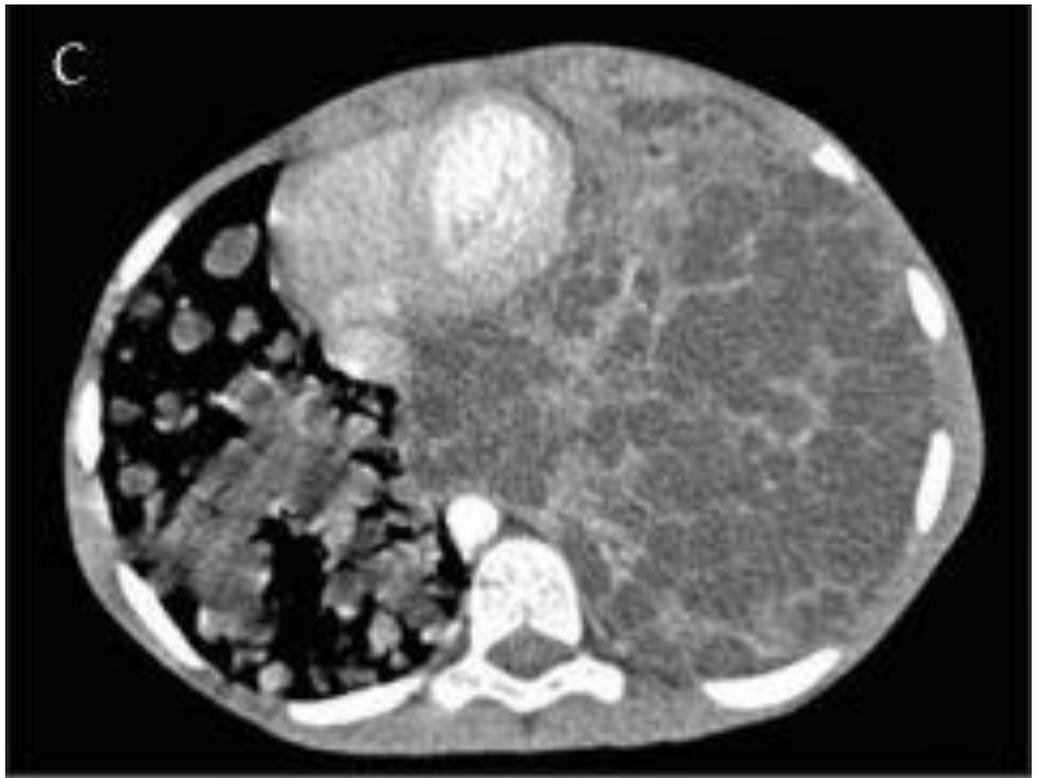
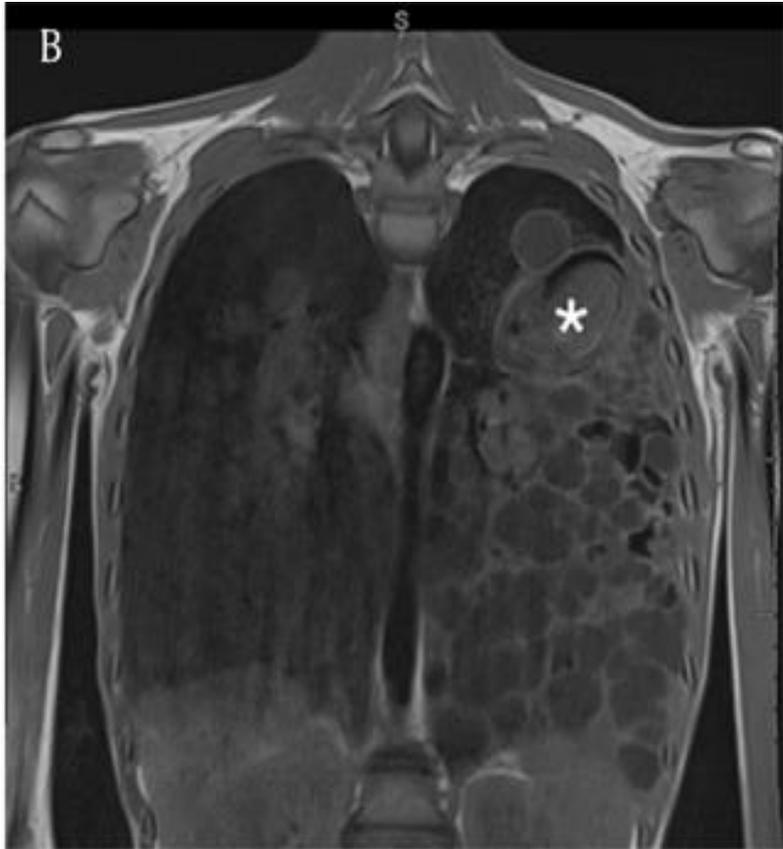
## Laboratory

### 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

