

# Echinococcosis : Basics

Dr. Kazi Mohammad Abrar Hasan

Associate Professor

Department of Medicine

Chittagong Medical College



- Human echinococcosis
- Zoonotic infection
- It is caused by the tapeworm of the genus Echinococcus

- 6 species have been recognized
- 4 of public importance
  - E. granulosus – Cystic Echinococcus
  - E. multilocularis – Alveolar Echinococcus
    - E. oligarthus , E. voligeli
  - ....Polycystic Echinococcus
- 2 new species have been recently identified
  - E. schiolicus – Tibetan mammals
  - E. felidis – African lion

- Increase **public health concern**
- **Emerging** or **re-emerging** disease



# Adult tapeworm

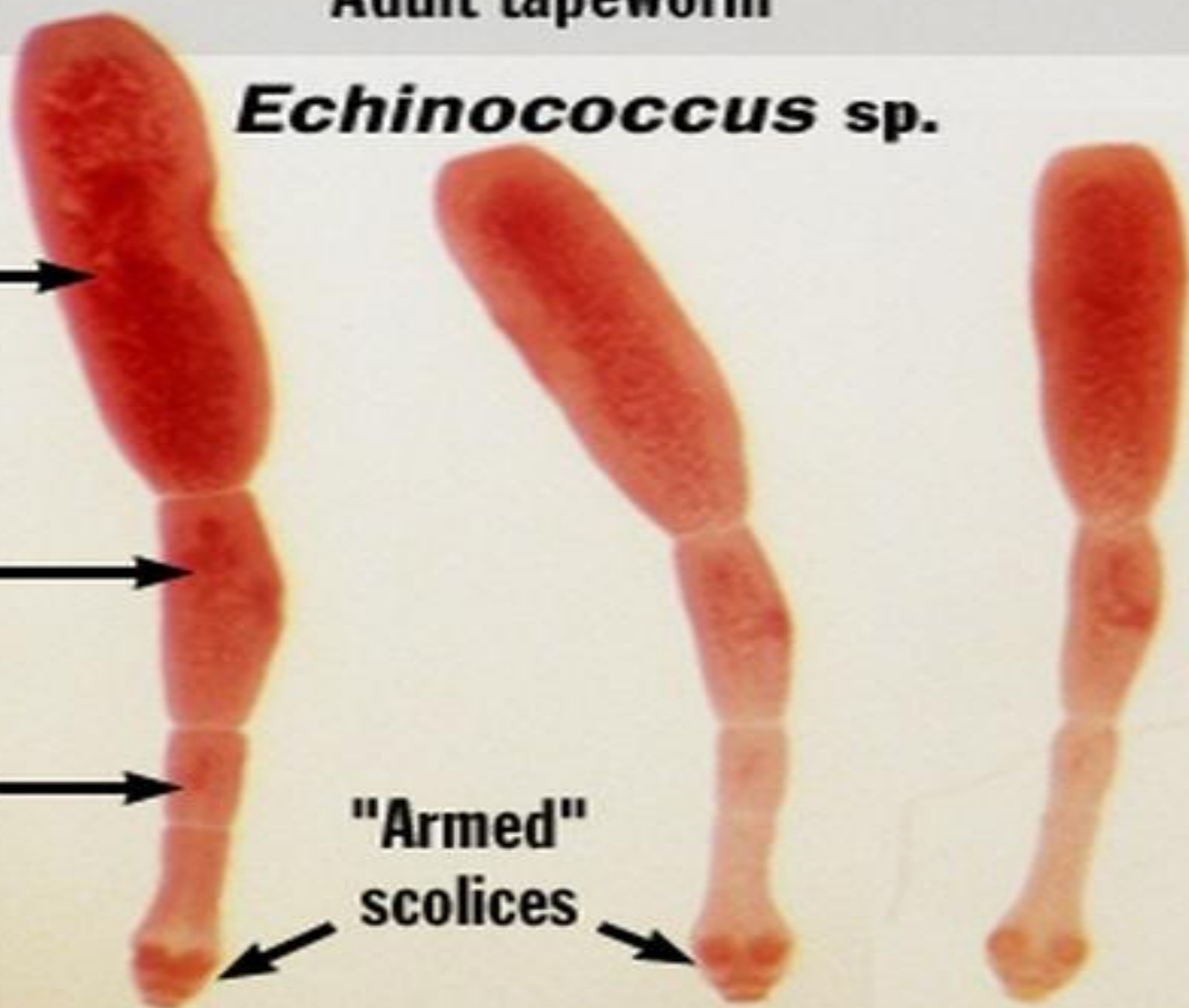
***Echinococcus* sp.**

Gravid  
proglottid

Mature  
proglottid

Immature  
proglottid

"Armed"  
scolices

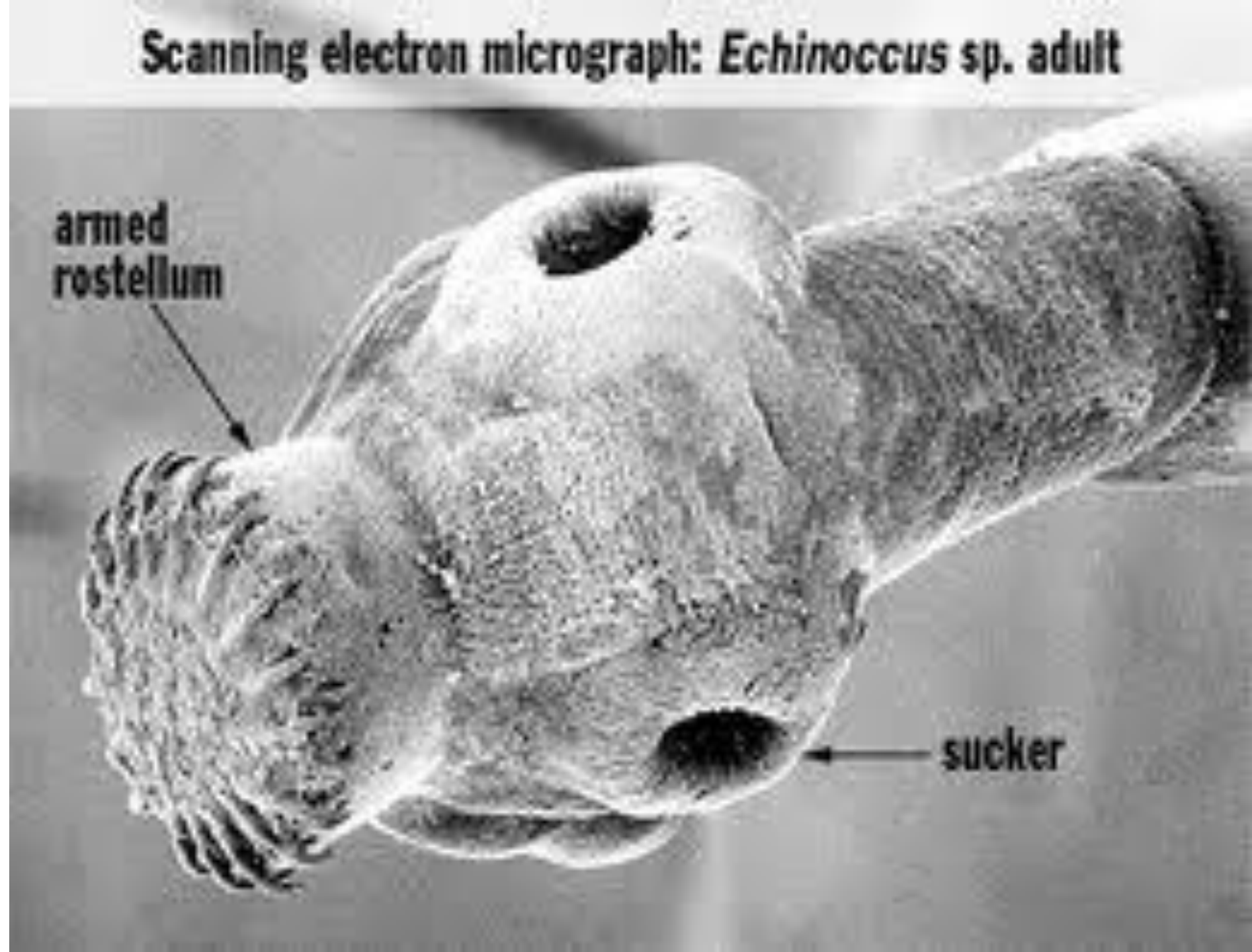




Scanning electron micrograph: *Echinococcus* sp. adult

armed  
rostellum

sucker





# Morphology

- 2-7 mm
- 3 proglottids
- Immature, mature, gravid
- Scolex – 4 suckers, rostellum, hooks



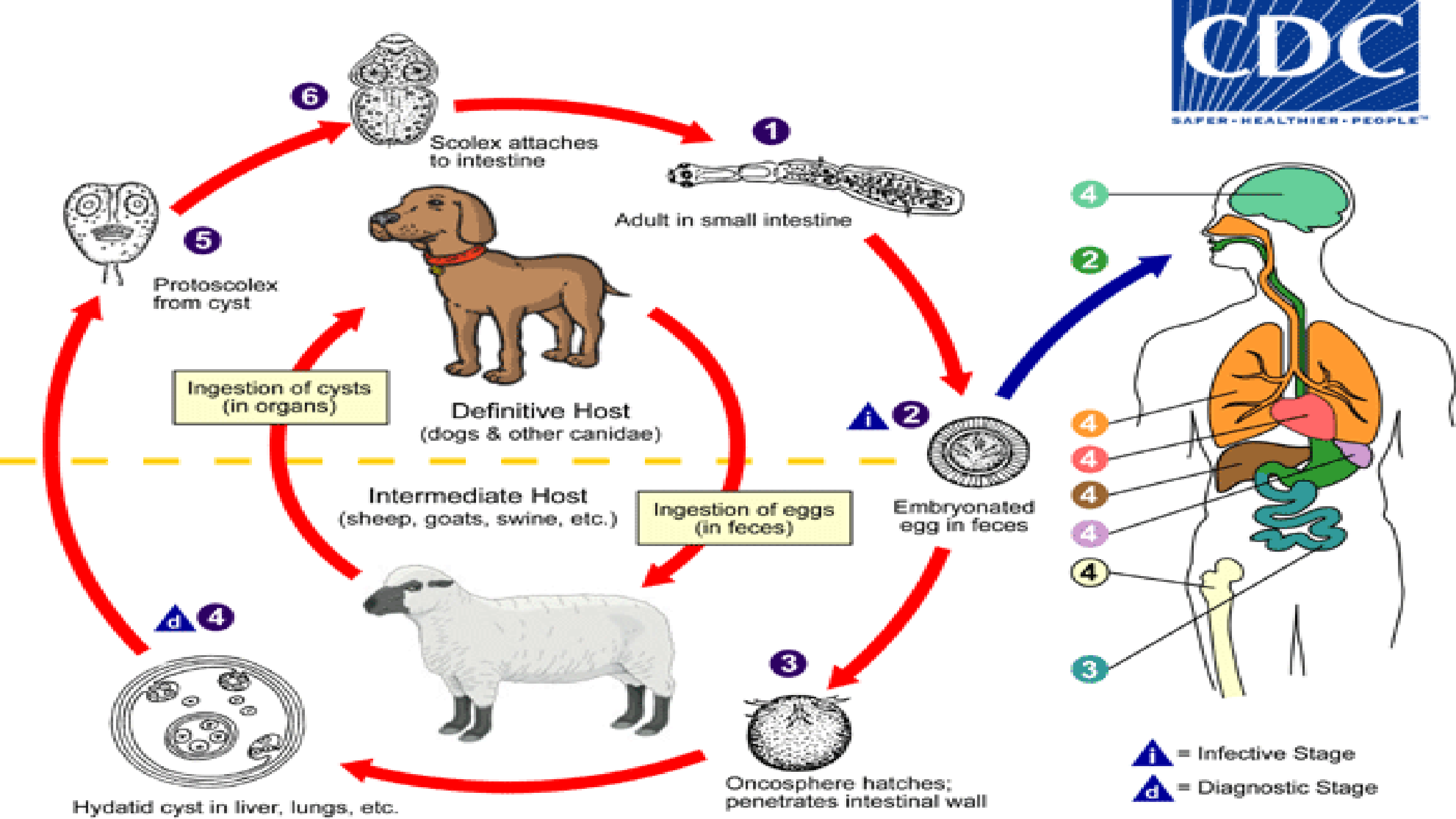
***Triploblastic***

***No anus***

***No digestive***



**Adult female worm of Echinococcus granulosus**



# Reservoirs

Hosts	Examples
<b>Definitive hosts</b>	<b>Canids (canines); dogs, wolves and (felines) cats.</b>
<b>Intermediate hosts</b>	<b>Herbivores like sheep, deer, goats, horses, cattle, wallabies, kangaroos and pigs that graze on grass infected with the eggs of the parasite.</b>
<b>Accidental hosts</b>	<b>Humans (Dead end hosts)</b>



# In Australia.....

(Where it *Echinococcus granulosus* is most prevalent)



Farm-dog to sheep cycle

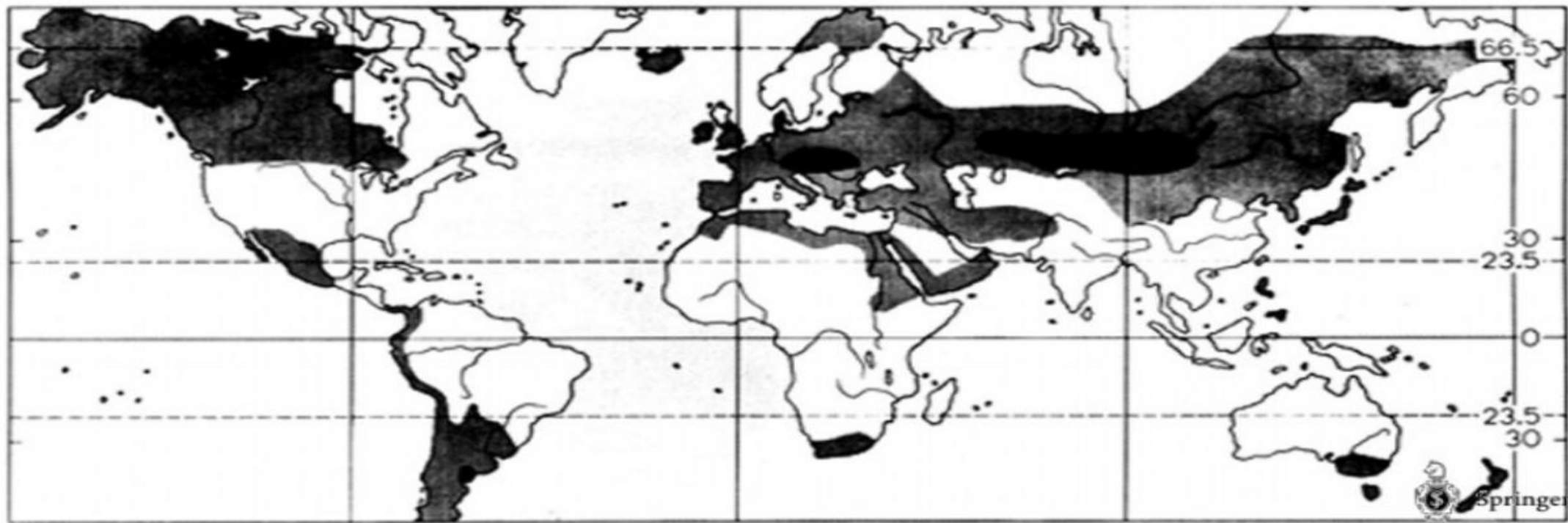
Wild 'reservoir' cycle

# Epidemiology

- Worldwide
- Sheep, cattle, dog rearing countries
- Africa, Central Asia, South America, Australia, Middle East



# Epidemic Areas



Central Europe

Mediterranean countries

Australia & New Zealand

South America

Middle East

South Africa

## E. granulossus cyst

- Slow development of cyst
- Cysts have thick-walled chambers
- Separated by connective tissue
- Cyst is fluid filled
- Cyst is free of host material

# Unilocular hydatid cyst



# Clinical Manifestation

- Any body area, esp. Lung, liver, CNS
- 10 to 20 years silent
- Upper abdominal discomfort/ pain
- Nausea/ vomiting/ coughing
- Unexplained weight loss
- Ruptured cyst – Allergic reaction
- Pressure on cyst

# Pathophysiology

- Primary –Ingestion, 80%
- Secondary – Larval proliferation
- Pericyst
- Endocyst





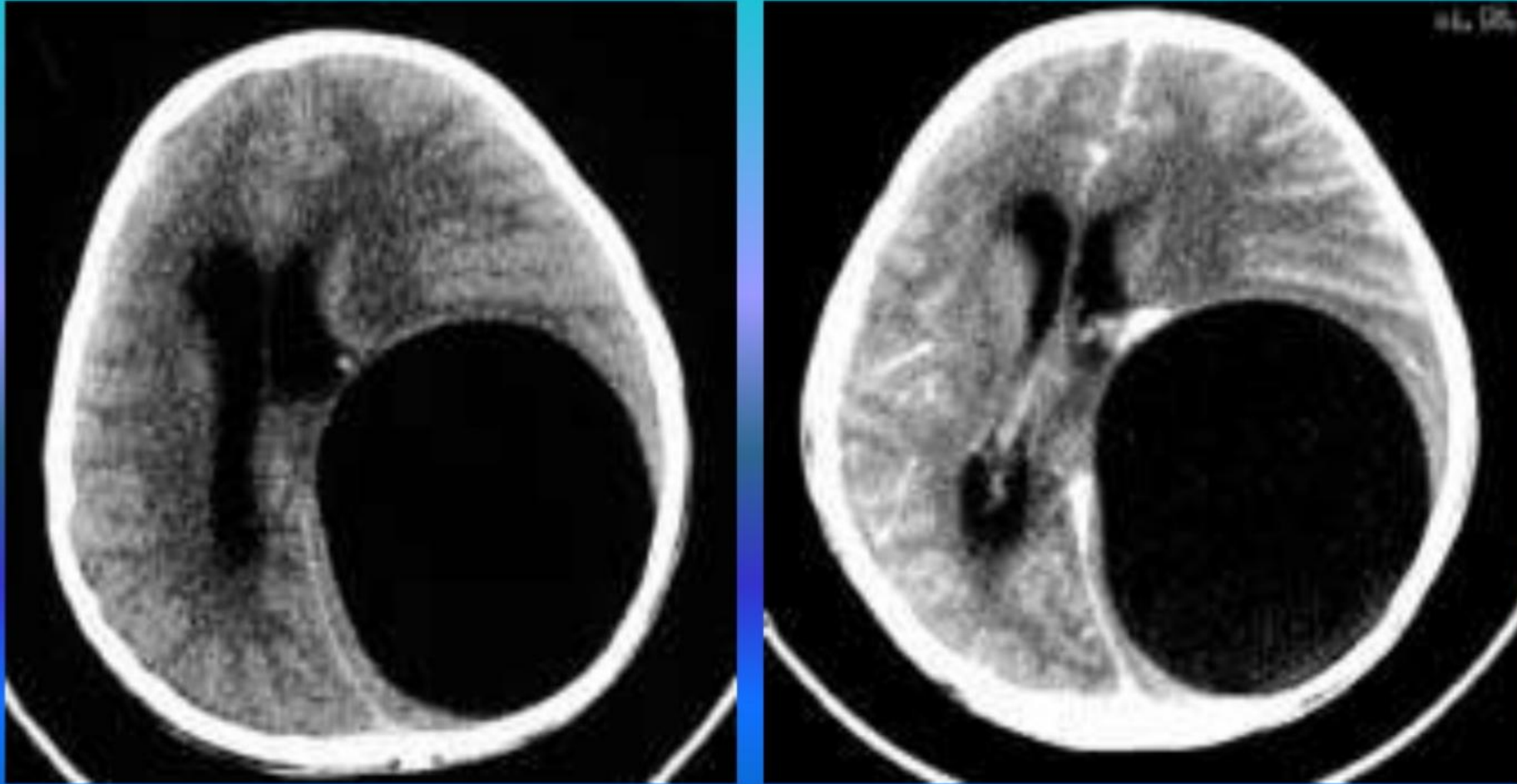
# Cystic hydatid disease



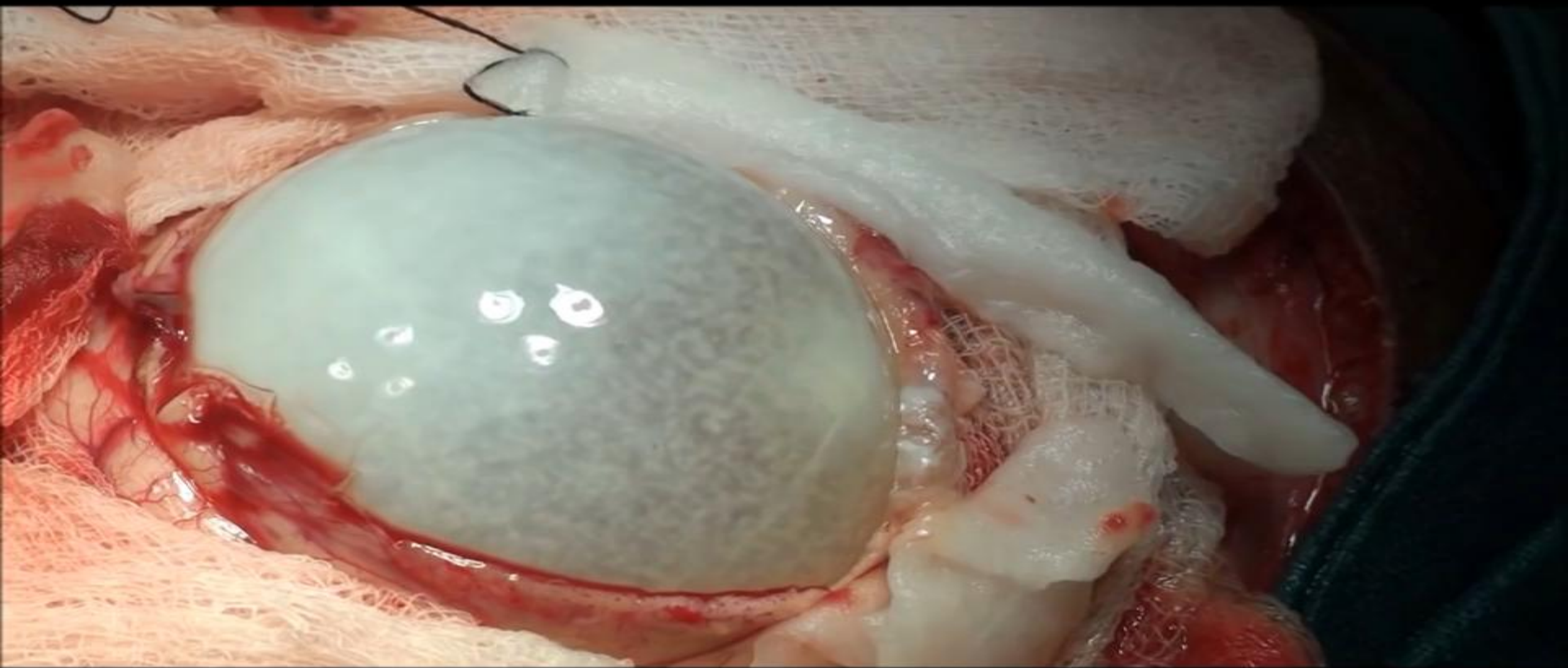


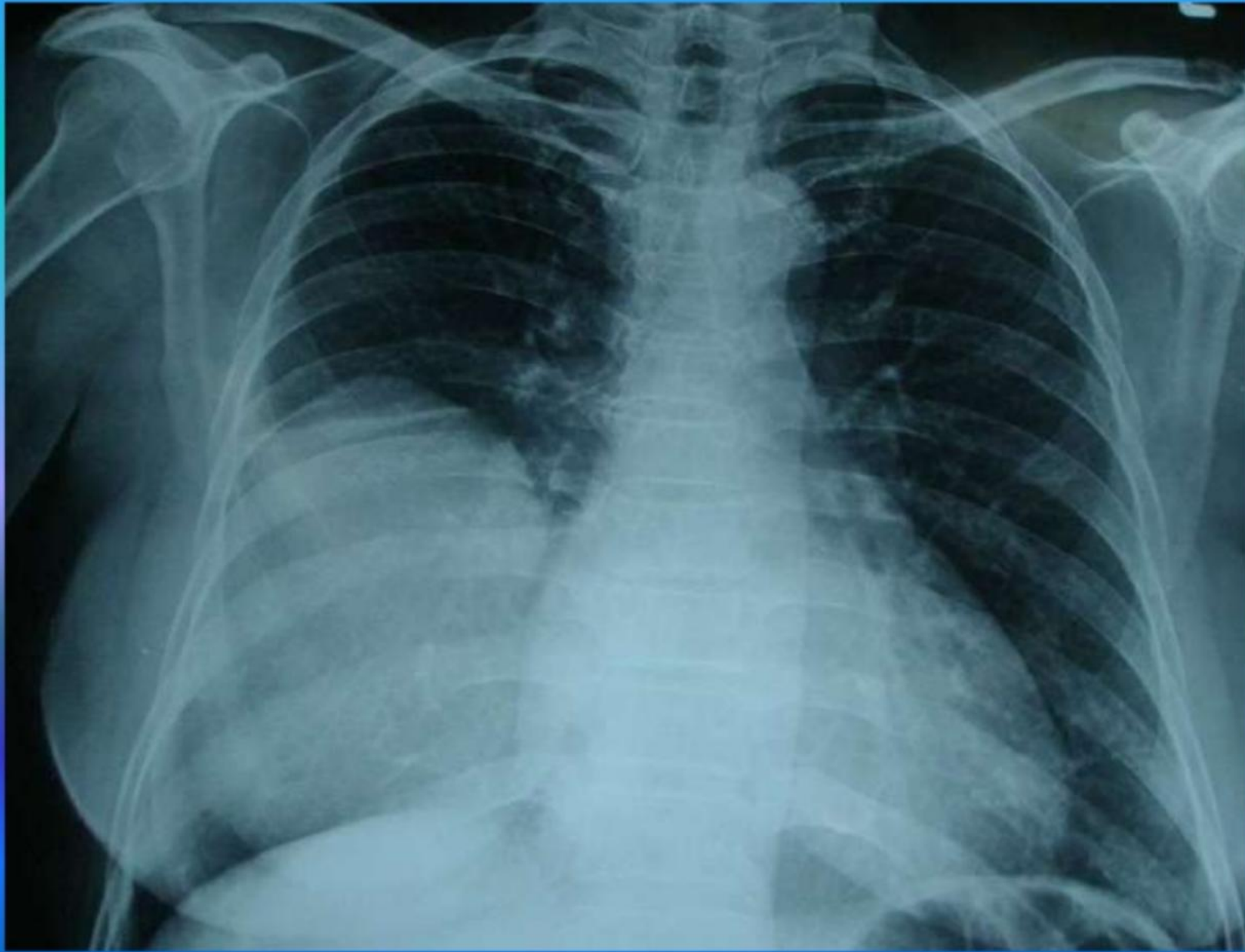
## ***Cerebral hydatid disease:***

***Cerebral hydatid disease is very rare, representing only 2% of all cerebral space occupying lesions even in the countries where the disease is endemic.***



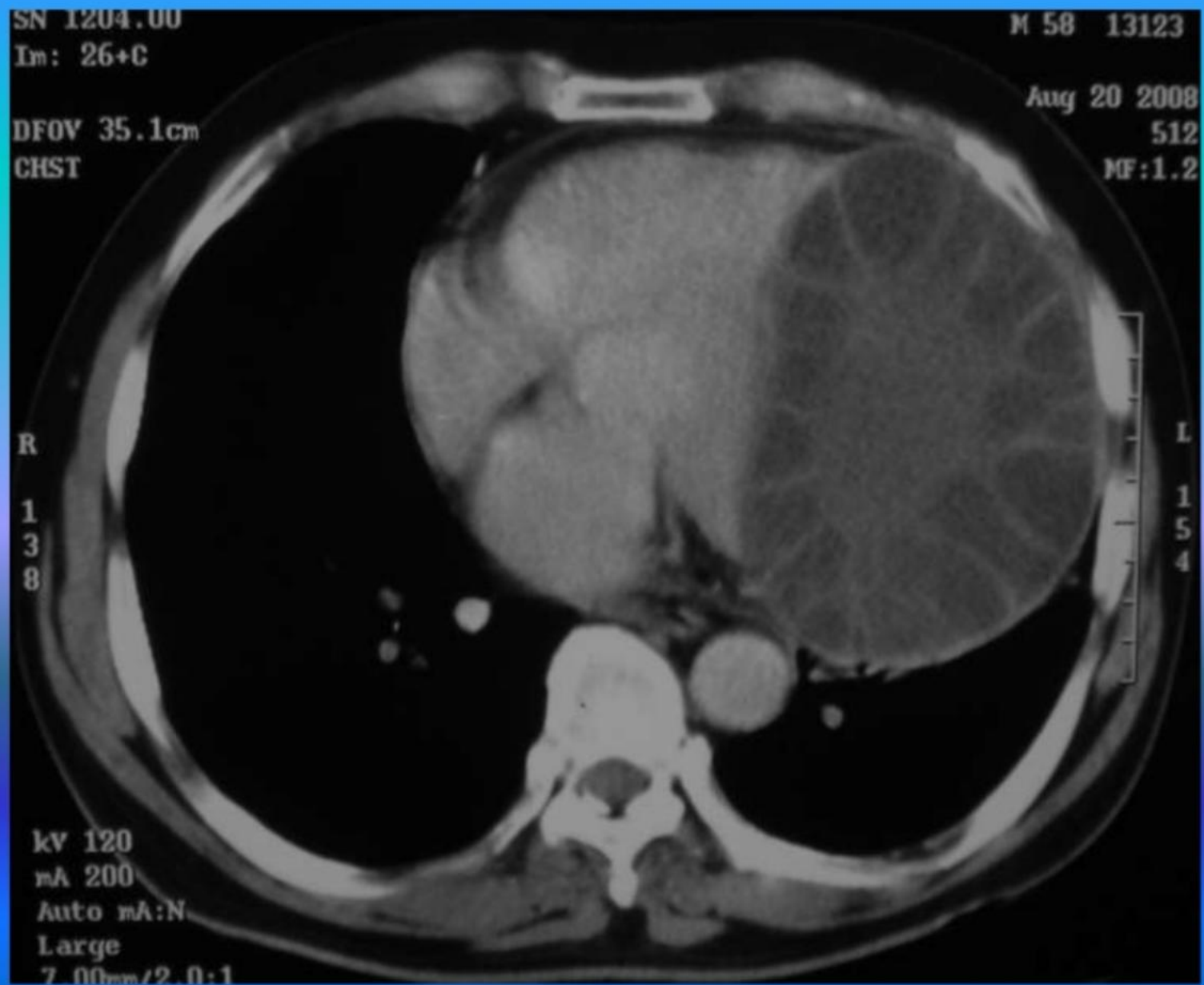
***left parieto-occipital hydatid disease.***



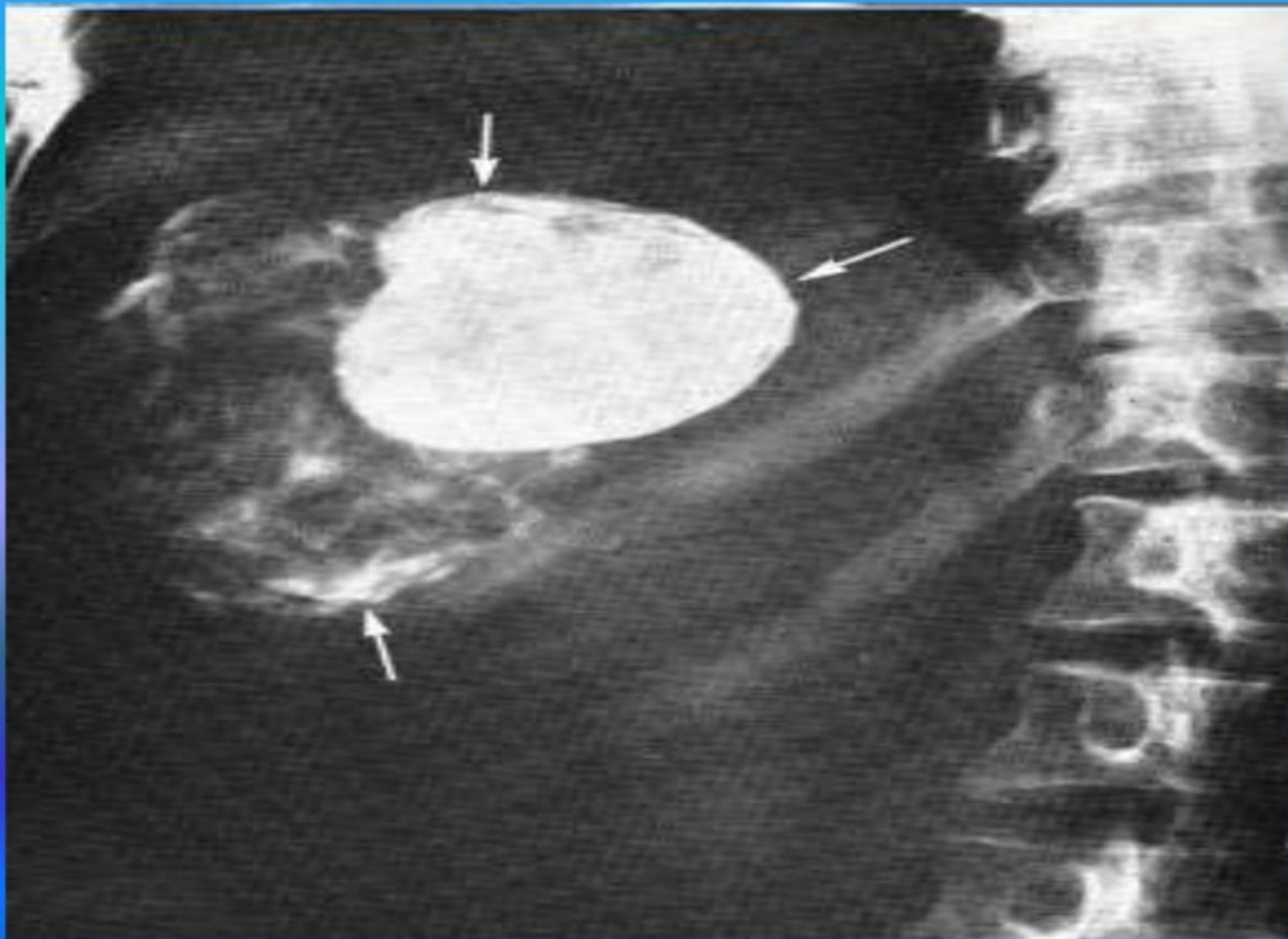


***Right lower lung hydatid cyst.***

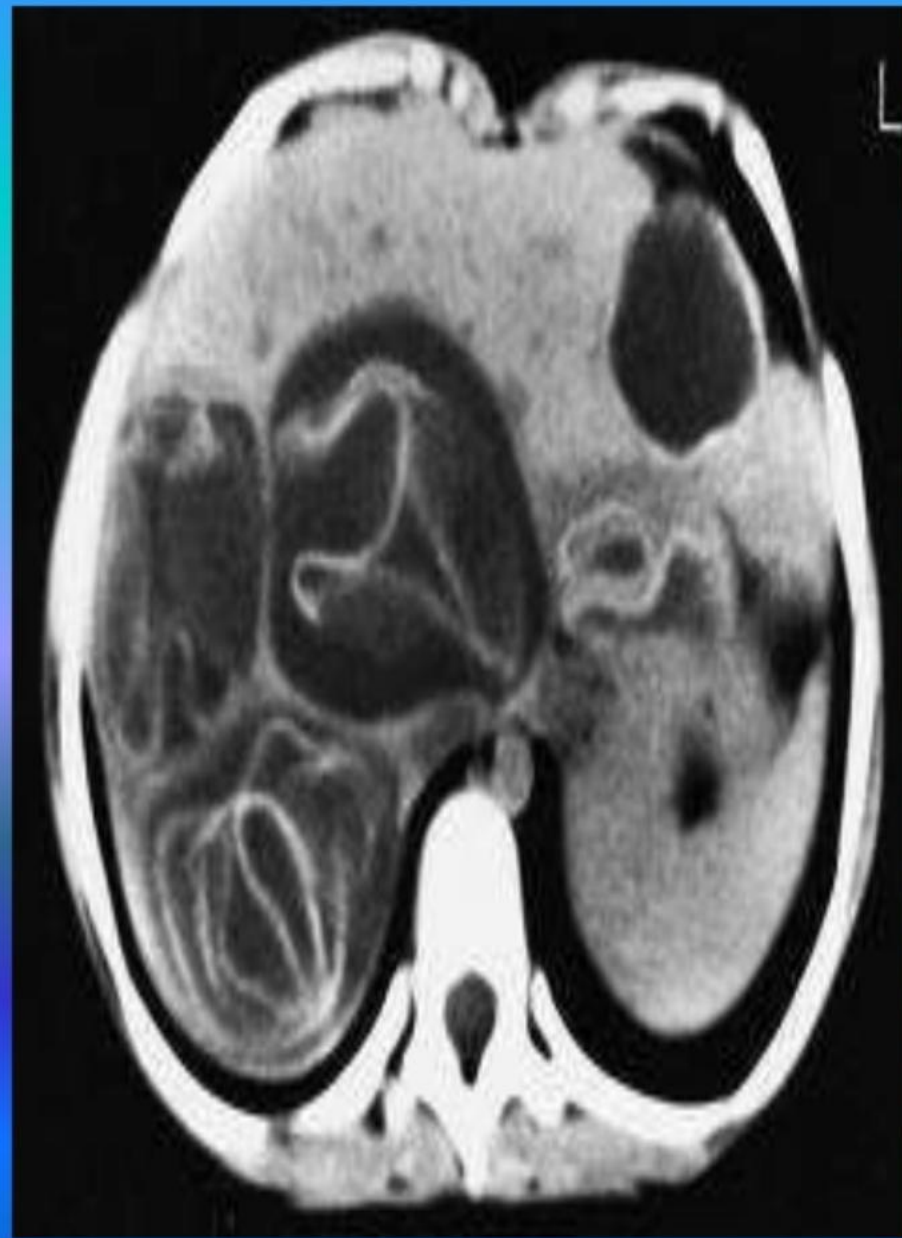




*Cardiac hydatid cyst.*



*X-Ray show hydatid disease of the right liver lobe.*

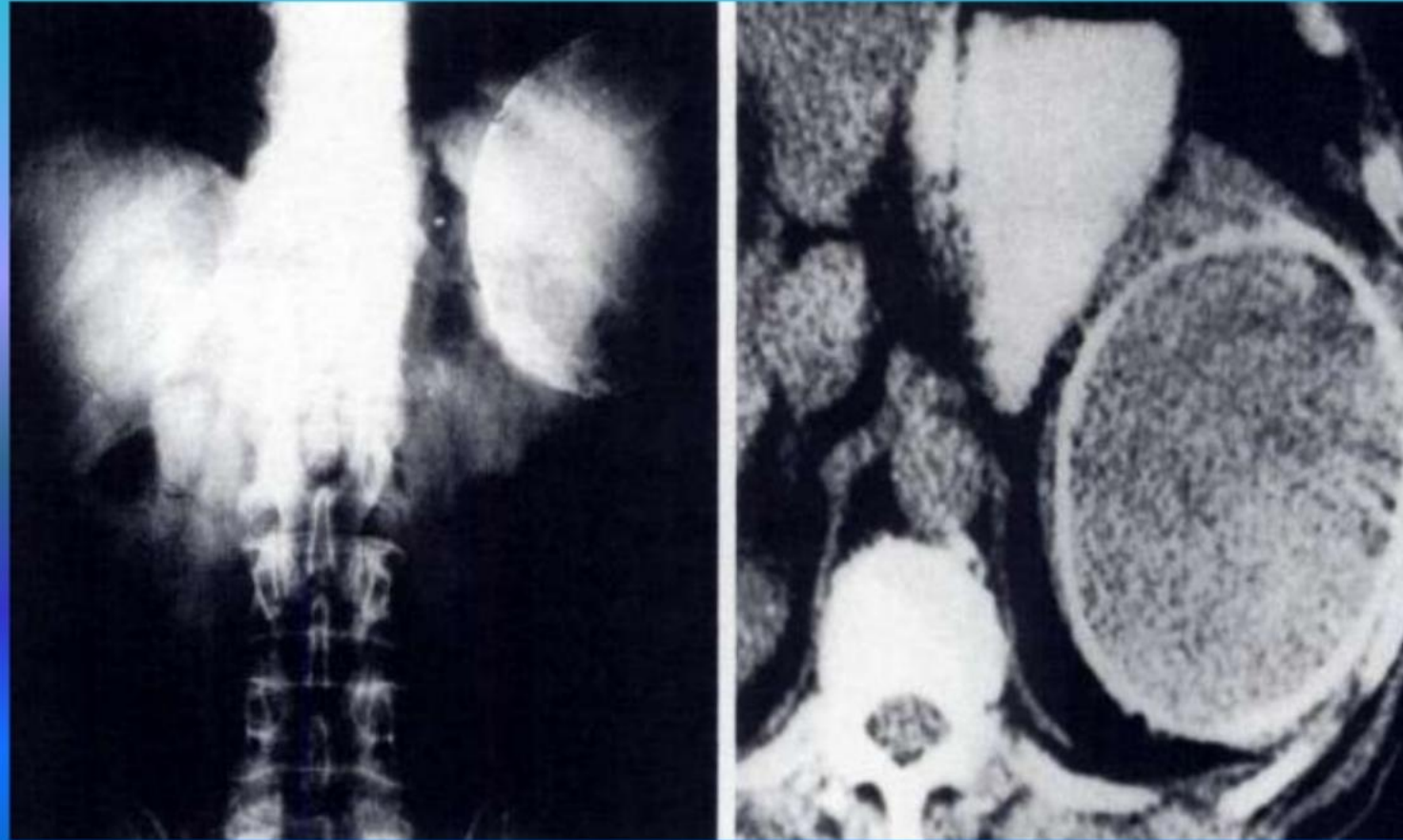


***Hydatid disease with daughter cyst and water lily sign.***



## ***Hydatid Disease of the Spleen***

***Splenic involvement in hydatid disease is uncommon, representing less than 2% of all human infestations by Echinococcus .***



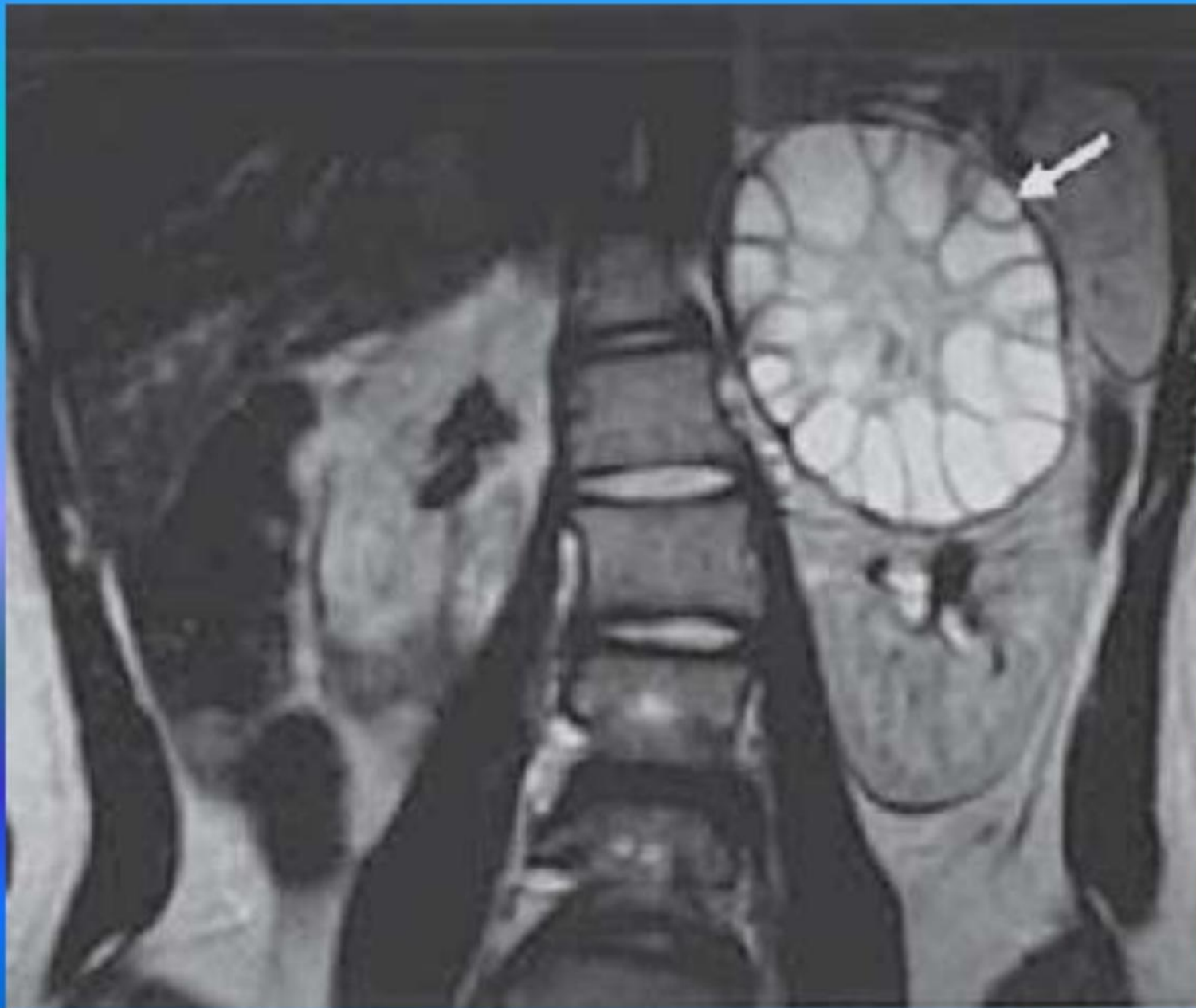
***Splenic hydatid cyst.***



## ***Primary hydatid cyst of kidney.***

***Kidney involvement in echinococcosis is extremely rare, constituting only 2-3% of all cases. Primary involvement of the kidney without the involvement of the liver and lungs is even more rare.***

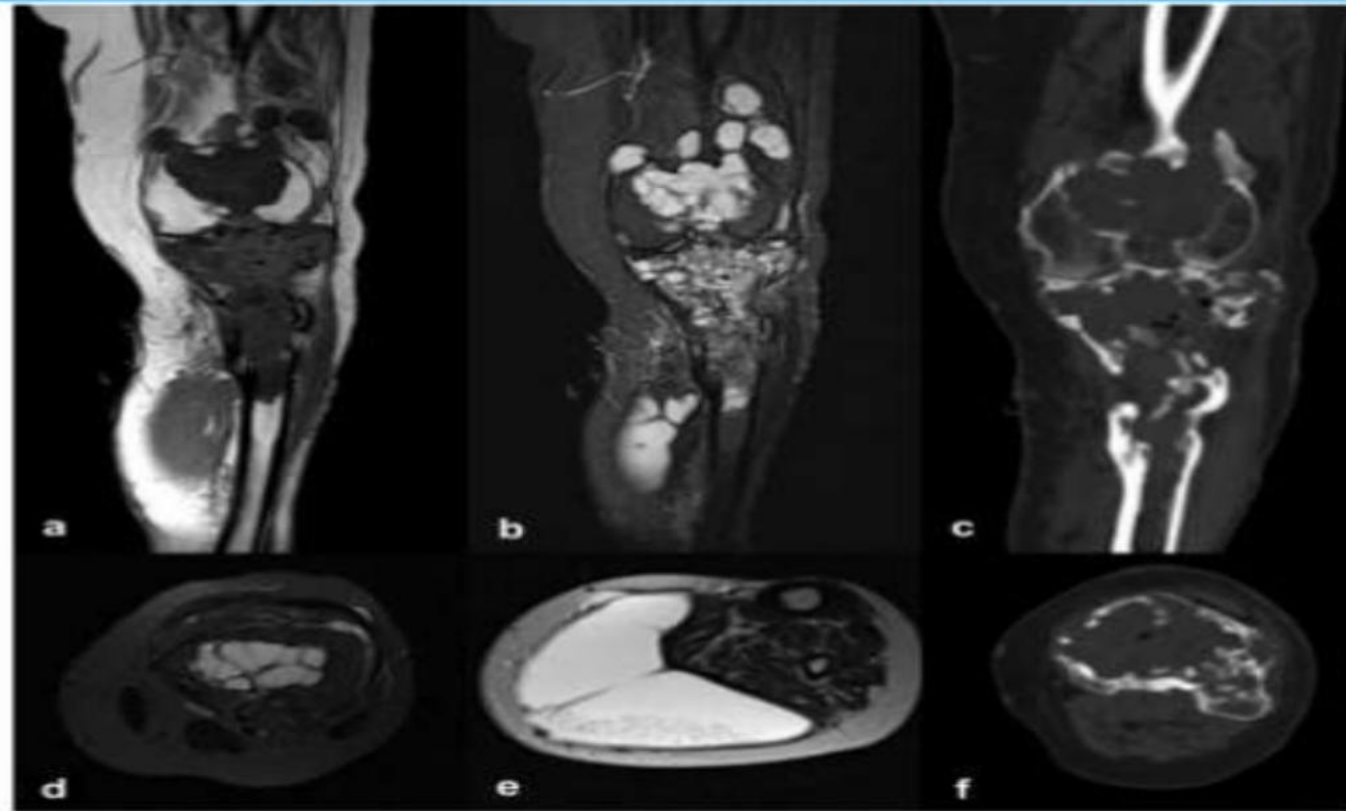




***Hydatid disease of left kidney.***

## ***Bone hydatid disease.***

***Bone hydatid disease lacks a typical clinical appearance and image characteristics on x ray or CT are similar to those of tuberculosis, metastases and giant cell tumour or bone cysts. However, MRI does show distinctive diagnostic features of bone hydatid disease, especially in the spine.***



**Fig. 1 — A 50-year-old patient with hydatidosis of femur and tibia. There are multiple cystic lesions with bone destruction seen in the lower end of femur and tibia with destruction of the cortex and involvement of the knee joint cavity. A co-existent hydatid cyst of the calf muscle is also seen with daughter cysts. (a) Coronal T1W MRI, (b) Coronal STIR MRI, (c) Coronal CT reformation, (d) Axial STIR MRI, (e) Axial T2W MRI, (f) Axial CT scan.**

# Laboratory Diagnosis

- Indirect fluorescent antibody
- Immuno-electrophoresis,
- Enzyme-linked immunosorbent assay (ELISA)
- Radioallergosorbent (RAST) test.
- A new dot immunobinding assay (DIA) for the detection of hydatid antigen-specific antibodies (HA-DIA) has been described.



# PREVENTION

- Health education in areas where the disease is known to occur about basic hygienic practices.
- De-worming dogs on a routine basis to prevent spread of the disease.
- Make it a practice to feed dogs with only commercially prepared dog foods from reputable manufacturers
- Do not feed raw or infected offal waste meats that include organs and entrails to a dog.
- Wash hands before eating, drinking and smoking and after gardening or handling animals or their pens.
- Children should avoid direct contact with dogs and indirectly through soil, water and contaminated vegetables and teach them to wash hands.

# TREATMENT

- Surgery taking special care to leave the cyst intact so that new cysts do not form.
- Mebendazole over a long period of time at low dosages.
- Albendazole
- Praziquantel









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