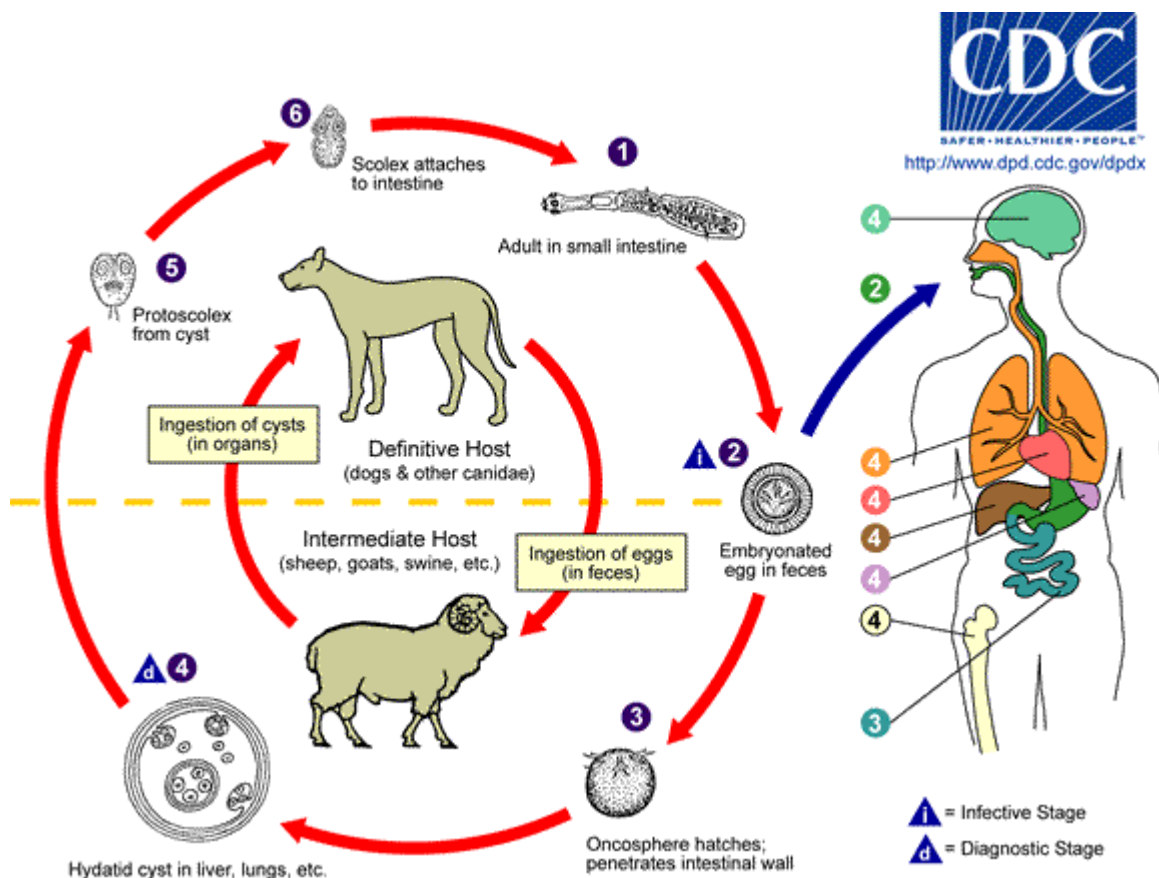


Echinococcosis

Causal Agent:

Human echinococcosis (hydatidosis, or hydatid disease) is caused by the larval stages of cestodes (tapeworms) of the genus *Echinococcus*. *Echinococcus granulosus* causes cystic echinococcosis, the form most frequently encountered; *E. multilocularis* causes alveolar echinococcosis; *E. vogeli* causes polycystic echinococcosis; and *E. oligarthrus* is an extremely rare cause of human echinococcosis.

Life Cycle:



The adult *Echinococcus granulosus* (3 to 6 mm long) **1** resides in the small bowel of the definitive hosts, dogs or other canids. Gravid proglottids release eggs **2** that are passed in the feces. After ingestion by a suitable intermediate host (under natural conditions: sheep, goat, swine, cattle, horses, camel), the egg hatches in the small bowel and releases an oncosphere **3** that penetrates the intestinal wall and migrates through the circulatory system into various organs, especially the liver and lungs. In these organs, the oncosphere develops into a cyst **4** that enlarges gradually, producing protoscolices and daughter cysts that fill the cyst interior. The definitive host becomes infected by ingesting the cyst-containing organs of the infected intermediate host. After ingestion, the protoscolices **5** evaginate, attach to the intestinal mucosa **6**, and develop into adult stages **1**.

in 32 to 80 days. The same life cycle occurs with *E. multilocularis* (1.2 to 3.7 mm), with the following differences: the definitive hosts are foxes, and to a lesser extent dogs, cats, coyotes and wolves; the intermediate host are small rodents; and larval growth (in the liver) remains indefinitely in the proliferative stage, resulting in invasion of the surrounding tissues. With *E. vogeli* (up to 5.6 mm long), the definitive hosts are bush dogs and dogs; the intermediate hosts are rodents; and the larval stage (in the liver, lungs and other organs) develops both externally and internally, resulting in multiple vesicles. *E. oligarthrus* (up to 2.9 mm long) has a life cycle that involves wild felids as definitive hosts and rodents as intermediate hosts. Humans become infected by ingesting eggs ②, with resulting release of oncospheres ③ in the intestine and the development of cysts ④, ④, ④, ④, ④, ④ in various organs.

Geographic Distribution:

E. granulosus occurs practically worldwide, and more frequently in rural, grazing areas where dogs ingest organs from infected animals. *E. multilocularis* occurs in the northern hemisphere, including central Europe and the northern parts of Europe, Asia, and North America. *E. vogeli* and *E. oligarthrus* occur in Central and South America.

Clinical Features:

Echinococcus granulosus infections remain silent for years before the enlarging cysts cause symptoms in the affected organs. Hepatic involvement can result in abdominal pain, a mass in the hepatic area, and biliary duct obstruction. Pulmonary involvement can produce chest pain, cough, and hemoptysis. Rupture of the cysts can produce fever, urticaria, eosinophilia, and anaphylactic shock, as well as cyst dissemination. In addition to the liver and lungs, other organs (brain, bone, heart) can also be involved, with resulting symptoms. *Echinococcus multilocularis* affects the liver as a slow growing, destructive tumor, with abdominal pain, biliary obstruction, and occasionally metastatic lesions into the lungs and brain. *Echinococcus vogeli* affects mainly the liver, where it acts as a slow growing tumor; secondary cystic development is common.

Laboratory Diagnosis:

The diagnosis of echinococcosis relies mainly on findings by ultrasonography and/or other imaging techniques supported by positive serologic tests. In seronegative patients with hepatic image findings compatible with echinococcosis, ultrasound guided fine needle biopsy may be useful for confirmation of diagnosis; during such procedures precautions must be taken to control allergic reactions or prevent secondary recurrence in the event of leakage of hydatid fluid or protoscolices.

Diagnostic findings

- Microscopy
- Antibody detection

Treatment:

Surgery is the most common form of treatment for echinococcosis, although removal of the parasite mass is not usually 100% effective. After surgery, medication may be necessary to keep the cyst from recurring. The drug of choice for treatment echinococcosis is albendazole (*Echinococcus granulosus*). Some reports have suggested the use of albendazole or mebendazole for *Echinococcus multilocularis* infections.