

Tikrit University

College of Nursing

Basic Nursing Sciences



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Microbiology

Parasitology

Helminthes

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Helminthes

Classification of Medical Helminthology

These are:

2. Nematodes (Round worms)
3. Cestodes (Tape worms) The Trematodes and Cestodes are groups of flat worms.

Helminthology (helminths):

- 1- Platyhelminths (flat worms)
 - Class: Trematoda (Flat Worms or Flukes).
 - Class: Cestoda (Tape worms).
- 2- Nematelminths (round worms)
 - Class: Nematoda (Round worms).

Cestodes (tapeworms)

Laboratory Diagnosis

Stool Examination

* Eggs

€Microscopic examination of feces shows characteristic eggs of *Taenia* in 20–80% of patients.

€Formol ether sedimentation method of stool concentration is useful.

€Eggs can also be detected by cellophane swab method (NIH Swab) in 85–95% patients.

€Species identification cannot be made from the eggs, since the eggs of *T. saginata* and *T. Solium* are similar.

* Proglottids

€Species identification can be done by examining with a hand lens, the gravid proglottid pressed between

2 slides, when branching can be made out. (15–20 lateral branches in *T. saginata*; under 13 in *T. Solium*).

* Scolex

€Definitive diagnosis can also be established by demonstration of unarmed scolex in case of *T. saginata* after antihelminthic treatment.

*Detection of *Taenia* Antigen in feces: Antigen capture enzyme-linked immunosorbent assay (ELISA) using polyclonal anti sera against *Taenia* is employed to detect coproantigen in feces since 1990 and is more sensitive than microscopy (specificity 100% and sensitivity 98%). The drawback of the test is that it cannot differentiate between *T. saginata* and *T. solium*.

Serodiagnosis

Specific antibodies in serum can be demonstrated by ELISA, indirect immunofluorescence test and indirect hemagglutination (IHA) test.

Molecular Diagnosis

Both DNA probes and polymerase chain reaction (PCR) technique are used to detect and differentiate between eggs and proglottids of *T. saginata* and *T. solium*. It can also differentiate between the 2 subspecies of *T. saginata*, viz *T. saginata saginata* and *T. saginata asiatica*.

Laboratory Diagnosis of Cysticercosis

Diagnosis of cysticercosis is based on the following:

Laboratory diagnosis of Taenia spp.

Biopsy

Definitive diagnosis of cysticercosis is by biopsy of the lesion and its microscopic examination to show the invaginated scolex with suckers and hooks.

Imaging Methods

***X-ray**: Calcified cysticerci can be detected by radiography of subcutaneous tissue and muscles particularly in the buttocks and thigh. X-ray of the skull may demonstrate cerebral calcified cyst.

***Computed tomography (CT) scan** of brain is the best method for detecting dead calcified cysts. The cysticercal lesions appear as small hypodensities (ring or disc-like) with a bright central spot.

***Magnetic resonance imaging (MRI) scan** of the brain is more helpful in detection of non-calcified cysts and ventricular cysts. It also demonstrates spinal cysticerci.

Serology

Antibody detection

Anticysticercus antibodies in serum or cerebrospinal fluid (CSF) can be detected by ELISA and enzyme-linked immunoelectrotransfer blot (EITB) tests.

Antigen detection

Antigen can be detected in serum and CSF by ELISA, using monoclonal antibodies and indicate recent infection.

Laboratory Diagnosis

Imaging

Radiological examinations and other imaging techniques such as ultrasonography (USG), CT scan, and MRI reveal the diagnosis in most cases of cystic echinococcosis

*USG is the diagnostic procedure of choice. Cyst wall typically shows double echogenic lines separated by a hypoechoic layer (double contour). Pathogenic findings include daughter cysts and the 'water-lily' sign due to detached endocyst floating within the cavity.

*CT scan is superior for the detection of extrahepatic disease.

*MRI appears to add diagnostic benefit for cysts, especially at difficult sites such as spinal vertebrae and cardiac cysts.

*Plain X-rays permit the detection of hydatid cyst in lung and bones. In cases where long bones are involved, a mottled appearance is seen in the skiagram.

*IV pyelogram is often helpful for detection of renal hydatid cyst.

Examination of Cyst Fluid

Examination of aspirated cyst fluid under microscope after trichome staining reveals scolices, brood capsules, and hooklets. Exploratory puncture of the cyst to obtain cystic fluid should be avoided as it may cause escape of hydatid fluid and consequent anaphylaxis. Therefore, fluid aspirated from surgically removed cyst should only be examined.

Serology

Antibody detection

*Detection of serum antibodies using specific antigens (8 and 16 KDA) from hydatid fluid are frequently used to support the clinical diagnosis of cystic echinococcosis.

The tests include IHA, indirect immunofluorescence, and ELISA. In hepatic cysts, the sensitivity of test is relatively superior (85–98%) than pulmonary cyst (50–60%).

*The slide latex agglutination test and immune electrophoresis using hydatid fluid fraction 5 antigen are also widely used. Precipitin test and complement fixation test

(CFT) with hydatid antigen have also been found to be positive. CFT is not very sensitive and false positive reaction is seen in those receiving neural antirabic vaccine. CFT is useful after surgical removal of cysts, when a negative test has a better prognostic value.

Schistosoma Mansoni

Laboratory Diagnosis

Stool Microscopy

Eggs with lateral spines may be demonstrated microscopically in stools. Kato-katz thick smear or other concentration methods may be required when infection is light. Kato-katz thick smear provides quantitative data on the intensity of infection, which is of value in assessing the degree of tissue damage and monitoring the effect of chemotherapy.

Rectal Biopsy

Proctoscopic biopsy of rectal mucosa may reveal eggs when examined as fresh squash preparation between 2 slides.

Serological Diagnosis

Serological diagnosis by detecting schistosomal antigen and antibody is similar to that of *S.haematobium*.

Imaging

Ultrasonography (USG) is useful to detect hepatosplenomegaly and periportal fibrosis. **Blood Examination**

Blood examination may reveal eosinophilia, and increased levels of alkaline phosphatase.