Common Helminthic Infestation – Dr. Hersh

Trematode infection (trematodiasis)

- Amphistomiasis (amphistomes infection)
- Clonorchiasis (Clonorchis sinensis infection)
- Fascioliasis (Fasciola infection)
- Fasciolopsiasis (Fasciolopsis buski infection)
- Opisthorchiasis (Opisthorchis infection)
- Schistosomiasis/bilharziasis (blood fluke infection)

Roundworm infection (nematodiasis)

- Ancylostomiasis (Ancylostoma duodenale infection)
- Ascariasis (Ascaris infection)
- Filariasis (Wuchereria bancrofti, Brugia malayi infection)
- Onchocerciasis (Onchocerca volvulus infection)
- Soil-transmitted helminthiasis (infection of Ascaris lumbricoides, Trichuris trichiura, Necator americanus, Ancylostoma duodenale)
- Trichuriasis (whipworm infection)
- Trichostrongyliasis (Trichostrongylus spp. infection)

Tapeworm infection (cestodiasis)

- Echinococcosis (Echinococcus infection)
- Hymenolepiasis (Hymenolepis infection)
- Taeniasis/cysticercosis (Taenia infection)

Ascariasis (Ascaris lumbricoides)

- Life span of 10-24 mo
- A gravid female worm produces 200,000 eggs/day
- Ascariasis occurs globally
- Ascaris eggs can remain viable at 5-10°C for as long as 2 yr
- Key factors linked with a higher prevalence of infection include:
  - poor socioeconomic conditions
  - use of human feces as fertilizer
  - geophagia

Clinical Manifestations

- Pulmonary disease and obstruction of the intestinal biliary tract (cholecystitis or pancreatitis)
- Allergic symptoms, fever, urticaria, and granulomatous disease
- The pulmonary manifestations transient respiratory symptoms such as cough and dyspnea, pulmonary infiltrates, and blood eosinophilia.
- A more serious complication occurs when a large mass of worms leads to acute bowel obstruction
- Dead worms can serve as a nidus for stone formation

Diagnosis

- Microscopic examination of fecal smears
- Ultrasound examination of the abdomen
Treatment: (none have documented during the pulmonary phase of infection)

- Albendazole (400 mg PO once, for all ages)
- Mebendazole (100 mg bid PO for 3 days or 500 mg PO once for all ages)
- Piperazine citrate (causes neuromuscular paralysis of the parasite,)
- Nitazoxanide, pyrantel pamoate
- Surgery may be required for cases with severe obstruction

Enterobiasis (Enterobius vermicularis) (pinworm)

- Is a small (1 cm in length), white, threadlike nematode
- Human infection occurs by the fecal-oral route
- Enterobius infection may cause symptoms
  - mechanical stimulation
  - irritation
  - allergic reactions
  - migration of the worms to anatomic sites

Lifecycle

1. Adult males and females inhabit ileocecum.
2. Female migrates out of anus and deposits eggs in perianal region then dies.
3. Eggs hatch within a few hours and larvae return to large intestine via anus (retroinfection), crawl into genitourinary tract, or eggs are reingested by the host.

Transmission

- Embryonated eggs are on clothes, bedding, bathroom fixtures or dust.
- Embryonated eggs are ingested (finger sucking is considered a source of infection).
- Reinfection occurs by direct anus to mouth transfer, with eggs found under fingernails of children who have scratched the anal area.

Clinical presentation and complications

- Frequently asymptomatic
- Most frequent symptom: nighttime perianal itching
- Also: abdominal pain, insomnia, restlessness, anorexia, diarrhea
- Less common: vaginitis, dysuria, and UTI, chronic salpingitis
- Bacterial infections secondary to itching

Diagnosis

- History
- Identification of parasite eggs or worms

Treatment: infected individuals and their family members

- A single oral dose of mebendazole (100 mg PO for all ages) repeated in 2 wk
- a single oral dose of albendazole (400 mg PO for all ages) repeated in 2 wk,
- Frequent changing of underclothes
### Trichuriasis (Trichuris trichiura)

- Trichuriasis is caused by the whipworm, *Trichuris trichiura*
- Larvae escape from the shell in the upper small intestine
- Anterior three quarters whiplike portion remains within the superficial mucosa
- Trichuriasis occurs throughout the world
- Transmission can also occur indirectly through flies

#### Clinical Manifestations

- Most persons harbor low worm burdens and do not have symptoms
- Right lower quadrant or vague periumbilical pain
- Adult *Trichuris* suck approximately 0.005 mL of blood/worm/day
- Chronic dysentery, Rectal prolapse
- Anemia, Poor growth
- Developmental and cognitive deficits, There is no significant eosinophilia

#### Treatment

- Mebendazole (100 mg bid PO for 3 days or 500 mg PO once for all ages) is the drug of choice and
- Albendazole (400 mg PO once for all ages) is an alternative, but with heavy infections the daily dose of albendazole should be administered for 3 days.
- Nitazoxanide

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### Tapeworm Infections

#### Etiology

- The adult beef tapeworm (*Taenia saginata*)
- The pork tapeworm (*Taenia solium*)
- Are large parasites (4-10 m)
- Named for their intermediate hosts
- Their body is a series of hundreds or thousands of flattened segments (proglottids)
- Most anterior segment (scolex) anchors the parasite to the bowel wall
- Intermediate stage of the pork tapeworm (cysticercus) can also infect humans

#### Tapeworms

- Ingested via undercooked beef
- Live in intestines
- Symptoms
  - Usually absent
  - May include abdominal pain, fatigue, weight loss, diarrhea
- Adult beef & pork tapeworms are rare causes of intestinal obstruction, pancreatitis, cholangitis, & appendicitis.

#### Diagnosis

- Carriers of adult pork tapeworms are at increased risk for transmitting eggs with the pathogenic intermediate stage (cysticercus) to themselves or others
- Visual examination for gravid proglottids
- If the parasite is completely expelled, the scolex of each species is diagnostic

#### Treatment

- Infections with all adult tapeworms respond to praziquantel (25 mg/kg PO once).
- An alternative treatment for taeniasis is niclosamide. However, this medication is no longer available in the USA
- Prevention Prolonged freezing or thorough cooking of beef and pork kills the parasite
Cysticercoids

- Humans can be the definitive host (parasite sexual reproduction) as well as the intermediate host (parasite asexual reproduction) of Taenia solium, the pork tapeworm. Infection with the invasive intermediate stage (cysticercus) is called cysticercosis.

Clinical Manifestations

- Parenchymal (seizures as well as focal neurologic deficits, intellectual deterioration with dementia)
- Intraventricular (hydrocephalus and acute, subacute, or intermittent signs of increased intracranial pressure without localizing signs)
- Meningeal (signs of meningeal irritation and also increased intracranial pressure that results from edema, inflammation)
- Spinal (if spinal cord compression, nerve root pain, transverse myelitis, or meningitis)
- Ocular (decreased visual acuity due to cysticerci floating in the vitreous, retinal detachment, iridocyclitis, or orbital mass)

Diagnosis

- The most useful diagnostic study for parenchymal disease is MRI of the head
- Plain films may reveal calcifications in muscle or brain consistent with cysticercosis
- Serologic diagnosis using the enzyme-linked immunotransfer blot
- Neurocysticercosis is the most important and most frequent cause of eosinophilia in CSF

Treatment

- All family members of index cases of cysticercosis as well as persons handling the food of index cases should be examined
- Albendazole is the antiparasitic drug of choice (15 mg/kg/day PO divided bid for 7 days)
- Praziquantel is an alternative
- Patients should be medicated with prednisolone 2 mg/kg/day or 0.15 mg/kg/day oral dexamethasone
- Single antiepileptic agents are usually administered as well if there has been a history of seizures
- Manage hydrocephalus

Echinococcosis (Echinococcus granulosus and E. multilocularis)

- Echinococcosis (hydatid disease or hydatidosis) is the most widespread, serious human cestode infection in the world
  - E. granulosus (cystic hydatid disease)
  - More malignant E. multilocularis(alveolar hydatid disease)

Diagnosis

- Ultrasonography
- CT and MRI findings

Treatment

1. For simple, accessible cysts surrounded by tissue, ultrasound- or CT-guided Percutaneous Aspiration, Instillation (hypertonic saline or another scolicidal agent) and Re-aspiration (PAIR) is the preferred therapy
2. Surgery
3. Albendazole (15 mg/kg/day divided bid PO for 1-6 mo).
4. Alveolar hydatidosis is frequently incurable by any modality, except by partial hepatectomy, lobectomy.