Project: Ghana Emergency Medicine Collaborative

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Author(s): Katherine A. Perry (University of Michigan), RN, BSN 2012

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PARASITIC INFECTIONS

- Helminth
  - Schistosomiasis (parasitic worm)
  - Hookworm Disease
- African Trypanosomiasis (“sleeping sickness”)
- Cryptosporidiosis

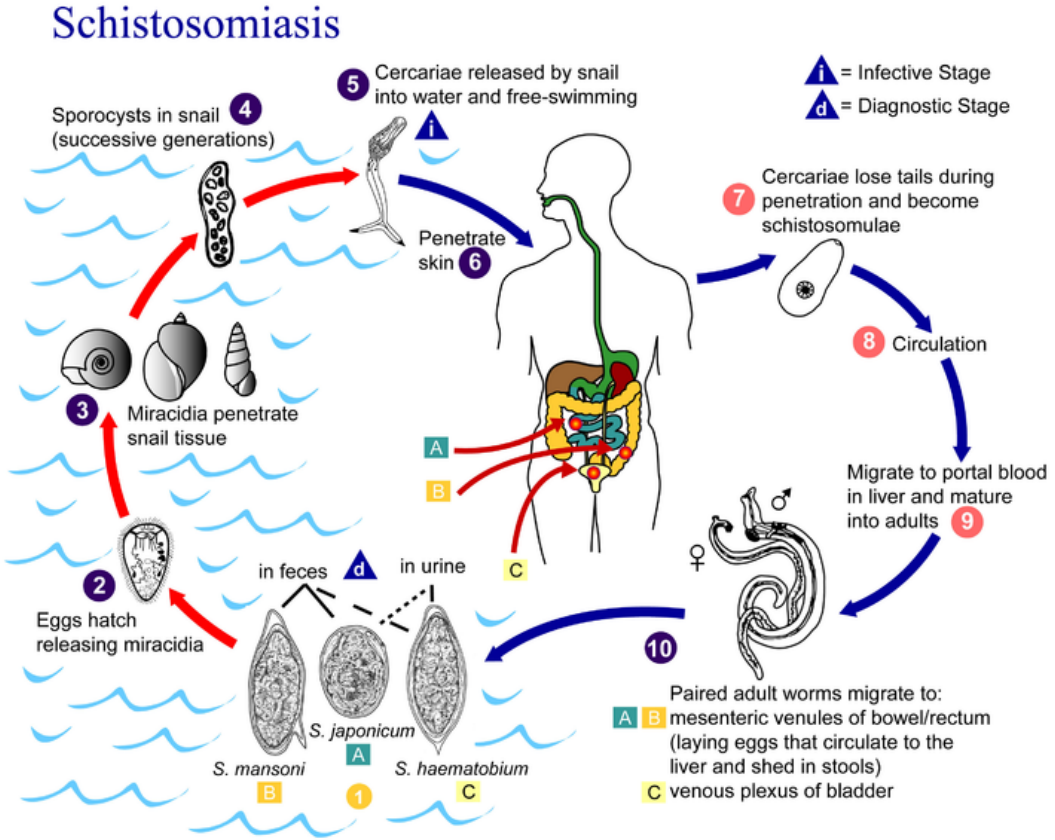
Helminth

- Schistosomiasis (bilharzia) - snail-transmitted, water-borne parasitic helminth

- Hookworm - soil-transmitted infection caused by the nematode parasites Necator americanus and Ancylostoma duodenale

Schistosomiasis

- Acute schistosomiasis (Katayama's fever) may occur weeks after the initial infection



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Symptoms

- Manifestations include
  - fever
  - cough
  - abdominal pain
  - diarrhea
  - hepatosplenomegaly
  - Eosinophilia
  - Portal hypertension with hematemesis and splenomegaly
  - cystitis and ureteritis with hematuria
  - pulmonary hypertension
  - glomerulonephritis
  - central nervous system lesions

Clinical Presentation

- "*swimmer's itch"* most often occurs 2 to 3 days after invasion as an itchy maculo-papular rash on the affected area of the skin

- Cercarial dermatitis is a self-limiting clinical entity

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Schistosomiasis

Diagnosis is based on the following:

1. Clinical signs and symptoms
2. History of living in an endemic area
3. Serological tests for anti-bodies and parasite antigens
4. Finding the characteristic eggs

Schistosomiasis Diagnosis

- Microscopic identification of eggs in stool or urine is the most practical method for diagnosis
- Stool examination should be performed when infection with *S. mansoni* or *S. japonicum* is suspected
- Urine examination should be performed if *S. haematobium* is suspected
- Eggs can be present in the stool in infections with all *Schistosoma* species. The examination can be performed on a simple smear (1 to 2 mg of fecal material)

Schistosomiasis Treatment

- Topical or systemic steroids can be for cercarial dermatitis & severe acute schistosomiasis
- DOC is praziquantel for infections caused by all *Schistosoma* species - single oral dose of 40 mg/ Kg is generally sufficient to give cure rates of between 60- 90% and reduction of 90-95% in the average number of eggs excreted
- Oxamniquine has been effective in treating infections caused by *S. mansoni* in some areas in which praziquantel is less effective

Patient Education

1. Avoiding contact with water known to contain cercariae
- Providing safe water supply to the community.
- Construct footbridges across infested rivers and streams.
- Providing safe recreational bathing sites

2. Preventing water becoming contaminated with eggs by:
- Health information on safe excreta disposal Treating infected persons, providing sanitary facilities

Patient Education

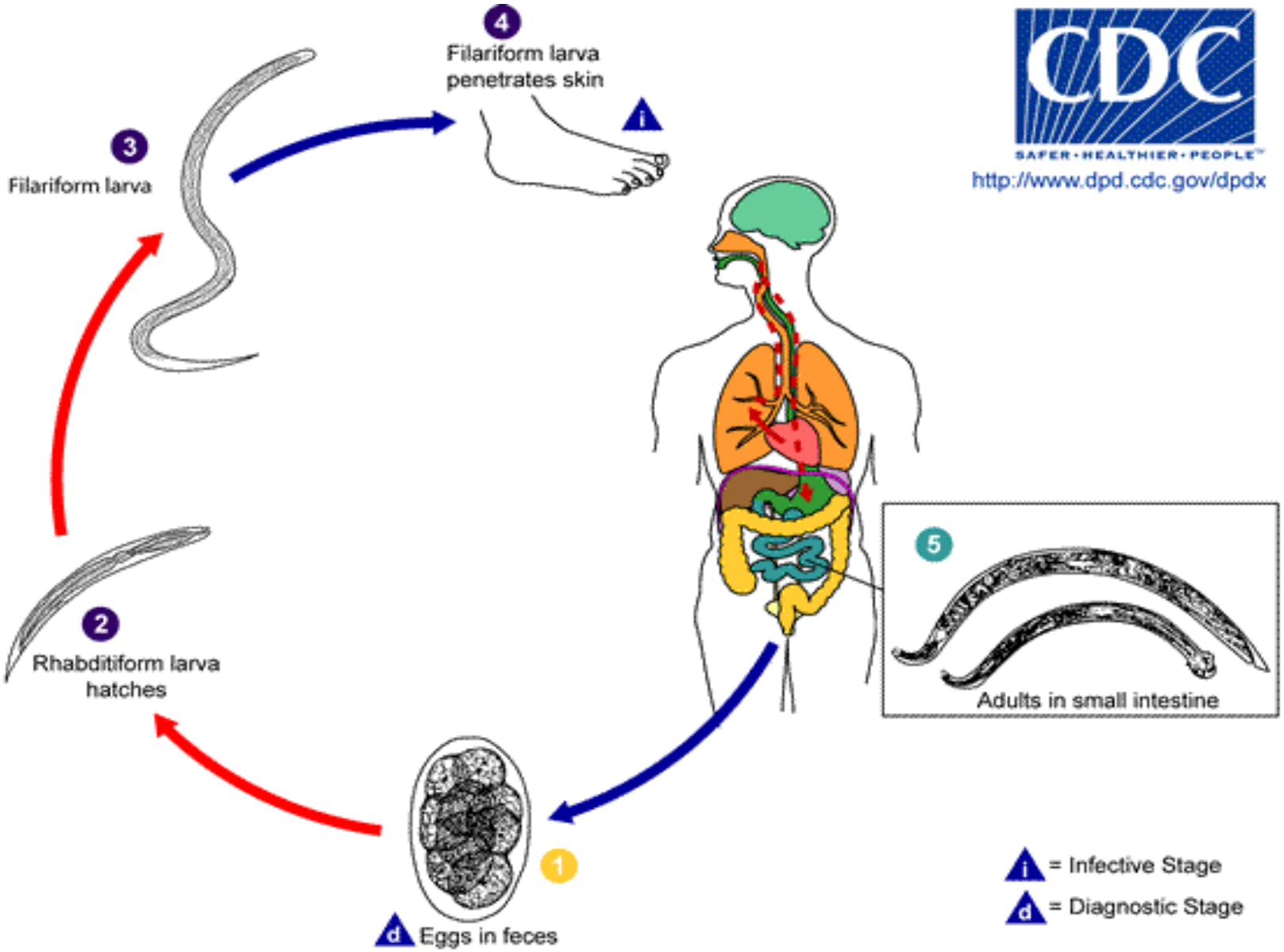
3. Taking environmental measures to prevent seasonal flooding which results in an increase in snail numbers in transmission

4. Treating water supplies by:

- Using a chlorine disinfectant where possible
- Storing water for 48 hours to allow time for any cercariae to die
- Using filter systems at water inputs to prevent cercariae from entering

Hookworm

- Hookworms live in the small intestine
- Eggs are passed in the feces of an infected person. If the infected person defecates outside (near bushes, in a garden, or field) or if the feces of an infected person are used as fertilizer, eggs are deposited on soil
- They can then mature and hatch, releasing larvae. Larvae mature & penetrate the skin of humans
- Hookworm infection is mainly acquired by walking barefoot on contaminated soil or ingestion of larvae



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Hookworm

Symptoms:

- Abdominal discomfort
- Blood in the stool
- Bloody sputum
- Cough
- Diarrhea
- Fever
- Itchy rash
- Nausea/vomiting
- Pale skin

Most people have no symptoms once the worms enter the intestines

Hookworm Diagnosis

Exams and Tests

- CBC
- Stool & parasite exam

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Treatment of Hookworm

Treatment Goals:

- Cure the infection
- Treat complications of anemia
- Improve nutrition
- Parasite-killing medications such as albendazole, mebendazole, or pyrantel pamoate are usually prescribed
- Increase protein in diet to reduce complications of anemia

Hookworm Prevention

- Efforts to control hookworm infection include the sanitary disposal of feces and educational campaigns about the proper use of latrines

- Wearing shoes can help to prevent the Hookworm larvae from penetrating the feet. Proper disposal of feces in areas away from habitations can prevent the occurrence of infective larvae in the environment

Hookworm Complications

- Iron deficiency anemia caused by blood loss
- Nutritional deficiencies
- Protein loss with fluid buildup in the abdomen
- High chance of reinfection

African Trypanosomiasis
"sleeping sickness"

- Caused by microscopic parasites of the species *Trypanosoma brucei*
- Transmitted by the tsetse fly (*Glossina* species), which is found only in rural Africa
- Tsetse flies bite during daylight hours. Both male and female flies can transmit the infection

African Trypanosomiasis
“sleeping sickness”

Lives in the most savanna and woodland regions with > 500mm of rain a year

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African Trypanosomiasis
“sleeping sickness”

- In the first stage, the parasite is found in the peripheral circulation, but it has not yet invaded the central nervous system

- The second stage occurs once the parasite crosses the blood-brain barrier and infects the central nervous system,

Trypanosomiasis
Clinical Presentation

- Most patients develop
  - fever
  - headache
  - muscle and joint aches
  - drowsiness
  - sweating
  - mental status changes
  - enlarged lymph nodes within 1-2 weeks of the infective bite

- After a few weeks of infection, the parasite invades the central nervous system and eventually causes mental deterioration and other neurologic problems, death ensues usually within months

Trypanosomiasis Diagnosis

- Classic method for diagnosing African Trypanosomiasis infection is by microscopic examination of lymph node aspirate, usually from a posterior cervical node

- All patients diagnosed with African trypanosomiasis must have their cerebrospinal fluid examined to determine whether there is involvement of the central nervous system

Trypanosomiasis Diagnosis

- A physical examination may show signs of inflammation of the brain and its covering
- Tests include the following:
  - Blood smear
  - Cerebrospinal fluid test
  - CBC
  - Lymph node aspiration

Trypanosomiasis Treatment

Pentamidine and Suramin are recommended drug for first stage *T. b. gambiense* infection

- Educate your patients
- Pentamidine may affect -
  - blood sugar
  - headache
  - Chills
  - pale skin
  - shakes
  - anxiety and cold sweats
  - loss of appetite
  - urinary frequency
  - fruity smelling breath

Trypanosomiasis Diagnosis

- Patients taking Suramin may experience –
  - cloudy urine
  - crawling or tingling of the skin
  - diarrhea
  - faintness
  - increased skin color
  - Itching
  - joint pain
  - nausea
  - skin rash
  - stinging sensations
  - loss of appetite

Trypanosomiasis Prognosis

- Without treatment, death may occur within 6 months
- Complications include injury related to falling asleep while driving or performing other activities
- Progressive damage to the nervous system
- Sleep becomes uncontrollable as the disease gets worse, and eventually leads to coma
- Inflammation of the heart (myocarditis)

Trypanosomiasis
Prevention & Control

- There is no vaccine or drug for prophylaxis against African Trypanosomiasis

- Preventive measures are aimed at minimizing contact with tsetse flies

- Wear long-sleeved shirts and pants of medium-weight material in neutral colors that blend with the background environment. Tsetse flies are attracted to bright or dark colors, and they can bite through lightweight clothing.

Trypanosomiasis
Prevention & Control

- Inspect vehicles before entering. The flies are attracted to the motion and dust from moving vehic

- The tsetse fly is less active during the hottest part of the day but will bite if disturbed

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Cryptosporidium

- *Cryptosporidium* is a microscopic parasite that causes the diarrheal disease
- Passed in the stool of an infected person or animal commonly known as "Crypto"
- The parasite is protected by an outer shell that allows it to survive outside the body for long periods of time

Cryptosporidium Infection

How cryptosporidium spreads:

- putting accidently ingesting something that has come into contact with stool of a person or animal infected with Crypto
- swallowing recreational water contaminated with Crypto or water that can be contaminated with sewage or feces from humans or animals
- eating uncooked food contaminated with Crypto
- touching your mouth with contaminated hands. Hands can become contaminated through a variety of activities, such as touching surfaces (e.g., toys, bathroom fixtures, changing tables, diaper pails)
- exposure to human feces through sexual contact

Clinical Presentation

The most common symptoms of cryptosporidiosis are:

- Watery Diarrhea
- Stomach cramps or pain
- Dehydration
- Nausea
- Vomiting
- Fever
- Weight loss

Clinical Presentation

- Symptoms of cryptosporidiosis generally begin 2 to 10 days (average 7 days) after becoming infected with the parasite

- Young children, pregnant women & those with weakened immune system may be more susceptible to the dehydration resulting from diarrhea and should drink plenty of fluids while ill

Diagnosis

- Submit stool samples to see if you are infected

- Testing for Crypto can be difficult, several stool specimens over several days may be necessary

Treatment

- Nitazoxanide has been approved for treatment of diarrhea caused by *Cryptosporidium* in people with healthy immune systems
- Most people who have healthy immune systems will recover without treatment
- Diarrhea can be managed by drinking plenty of fluids to prevent dehydration
- Young children and pregnant women may be more susceptible to dehydration
- HIV-positive individuals who suspect they have Crypto should contact their health care provider.

Patient Education

Cryptosporidium can be very contagious…

- Wash your hands frequently with soap and water, especially after using the toilet, after changing diapers, and before eating or preparing food

- Do not swim in recreational water (pools, hot tubs, lakes, rivers, oceans, etc.)

- You can pass Crypto in your stool and contaminate water for several weeks after your symptoms have ended

Patient Education

- Immersion in the water is enough for contamination to occur
- Avoid close contact with anyone who has a weakened immune system
- Children with diarrhea should be excluded from child care settings until the diarrhea has stopped