Paragonimiasis

Table of Contents

Paragonimiasis

Overview:[2, 3,4,5]

Paragonimiasis is an uncommon disease in the United States. Trematodes of the *Paragonimus* genus cause paragonimiasis, a parasitic disease that ranges from a subactue to chronic inflammatory disease of the lung. More than 30 species of trematodes (flukes) of the genus *Paragonimus* have been reported which infect animals and humans.

The first case described in humans was at autopsy in Taiwan in 1879, when adult flukes were found in the lung. The most common is the Oriental lung fluke, *Paragonimus westermani*. The eggs are excreted unembryonated in the sputum, or alternately they are swallowed and passed with stool. In the external environment, the eggs become embryonated, and miracidia hatch and seek the first intermediate host, a snail, and penetrate its soft tissues. Miracidia go through several developmental stages inside the snail: sporocysts , rediae , with the latter giving rise to many cercariae , which emerge from the snail. The cercariae invade the second intermediate host, a crustacean such as a crab or crayfish, where they encyst and become metacercariae. This is the infective stage for the mammalian host. Human infection with P. westermani occurs by eating inadequately cooked or pickled crab or crayfish that harbor metacercariae of the parasite. The metacercariae excyst in the duodenum penetrate through the intestinal wall into the peritoneal cavity, then through the abdominal wall and diaphragm into the lungs, where they become encapsulated and develop into adults (7.5 to 12 mm by 4 to 6 mm). The worms can also reach other organs and tissues, such as the brain and striated muscles, respectively. However, when this takes place completion of the life cycles is not achieved, because the eggs laid cannot exit these sites. Time from infection to oviposition is 65 to 90 days.

Infections may persist for 20 years in humans. Animals, such as pigs, dogs and a variety of feline species, can also harbor P. westermani.

For a more complete overview of Paragonimiasis, refer to the following texts:

- *Control of Communicable Diseases Manual*. (CCDM), American Public Health Association. 19th ed. 2008.
- American Academy of Pediatrics. *Red Book: 2009 Report of the Committee on InfectiousDiseases.* 28th ed. 2009.
- Mandell, Douglas, and Bennett's *Principles and Practice of Infectious Diseases*. 7th ed.2010.

Case Definition:

Clinical Description

An illness caused by the Trematodes of the *Paragonimus* genus characterized by abdominal pain, diarrhea and urticaria during the acute phase, followed by fever, cough, dyspnea, chest pain, malaise and sweats. Chronic pulmonary symptoms may persist for several months including productive cough of tenacious and rusty or golden sputums. Complications of infection can lead to encephalopathy. Further, extrapulmonary infection can also occur with symptoms closely associated with the organ system affected. Paragonimiasis has a wide range of clinical manifestations.

Laboratory criteria for diagnosis

Laboratory-confirmed paragonimiasis shall be defined as the detection of *Paragonimus* in symptomatic or asymptomatic persons

1. Oocysts/eggs in stool or sputum by microscopic examination, or
2. Oocysts/eggs in intestinal fluid or small bowel biopsy specimens, or
3. Demonstration of reproductive stages in tissue preparations, or
4. Antibody detection using complete fixation (CF) or enzyme immunoassay (EIA) tests.

Case classification

Confirmed: a laboratory-confirmed case associated with one of the symptoms described above.
Probable: a clinically compatible case with significant radiographic findings in the absence of any laboratory confirmed tests.

Information Needed for Investigation:

- **Verify the diagnosis**. What laboratory tests were conducted and what were the results? Was paragonimiasis confirmed?
- **Establish the extent of illness**. Determine if household or other close contacts are, or were ill, by contacting the health care provider, patient or family member.
- **Determine the source of infection to prevent other cases.**
  - Has the case recently had recreational water contact?
  - Has the case traveled recently, in state, out of state or abroad?
  - Does the case recall consuming raw crayfish, undercooked crab or snails?

Notification:

- Contact the District Communicable Disease Coordinator upon learning of a suspected case of paragonimiasis.

Control Measures:

General

- Educate the population at risk in endemic areas on the mode of transmission and life cycle of the parasite.
- Stress thorough cooking of crustaceans.
- Dispose of sputum and feces in a sanitary manner.

For detailed information see:

- *Control of Communicable Diseases Manual*. (CCDM), American Public Health Association. 19th ed. 2008.
- *American Academy of Pediatrics*. Red Book: 2003 Report of the Committee on InfectiousDiseases. 28th ed. 2009.
- *Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases*. 7th ed.2010.

Treatment:

Praziquantel and triclabendazole are the two agents that the World Health Organization (WHO) recommendes to treat paragonimiasis. Praziquantel is the most commonly used and has a cure rate of 80-90%.[2]

Triclabendazole is currently not approved for use in the United States but is available on a compassionate care protocol from the Centers for Disease Control and Prevention Drug Services at (404) 639-3670. In areas where triclabendazole is available, it is becoming first-line therapy for treatment of paragonimiasis. Triclabendazole is administered at a dose of 10 mg/kg/d for 3 days or 20 mg/kg/d divided in 2 doses for 1 day. Cure rates have been as high as 98.5%.[2]

Laboratory Procedures:

Specimens:

Microscopic examination for Ova and Parasites:

Use an ova and parasite (O&P) kit, which contains two different preservatives, polyvinyl alcohol (PVA) and formalin to collect specimens. Specimens must be placed in both preservatives. Specimens may be shipped at room temperature. The Missouri State Public Health Laboratory (SPHL) performs this test. Specifically, request testing for *Paragonimus* on the specimen submission form.

Both Sputum and Stool specimens may be submitted to the SPHL using the O&P kit. Sputum specimens should be from the lower respiratory passages rather than a sample consisting mainly of saliva. Sputum specimens should be collected first thing in the morning.

Enzyme immunosorbent assay (EIA) antigen testing:
The SPHL does not routinely perform EIA testing of stool specimens for *Paragonimus*. However, some commercial laboratories do.

Reporting Requirements:

Currently, Paragonimiasis is not a reportable condition. However, it is an emerging condition in Missouri. Therefore we are requesting the following reporting requirements:

1. For suspect, probable and confirmed cases, complete Disease Case Report (CD-1) and a Paragonimiasis Supplemental Case Report.
2. Entry of the CD-1 into the Web Surv database negates the need for the paper CD-1 to be forwarded to a District Health Office.
3. Send the completed Paragonimiasis Supplemental Case Report to the District Health Office.
4. All outbreaks or "suspected" outbreaks must be reported as soon as possible (by phone, fax, or e-mail) to the District Communicable Disease Coordinator. This can be accomplished by completing the Missouri Outbreak Surveillance Report (CD-51).
5. Within 90 days of the conclusion of an outbreak, submit the final outbreak report to the District Communicable Disease Coordinator.

References:

1. Centers for Disease Control and Prevention, Parasite and Health, Subsection: *Paragonimiasis.* http://www.dpd.cdc.gov/dpdx/HTML/Frames/M-R/Paragonimiasis/body_Paragonimiasis_page1.htm#Causal%20Agent (2/10/2011).
2. Liu Q, Wei F, Liu W, Yang S, Zhang X. Paragonimiasis: an important food-borne zoonosis in China. Trends Parasitol. Jul 2008;24(7):318-23.
3. Maguire JH. Trematodes (Schistosomes and other Flukes). In: Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases. Vol 2. 7th ed. Philadelphia, PA: Churchill Livingstone; 2010:3283-4.
4. *Control of Communicable Diseases Manual.* Paragonimiasis In: Heymann DL, ed.19th ed. Washington, D.C.: American Public Health Association; 2008: 450-452.
5. *American Academy of Pediatrics*. Cryptosporidiosis. In: Pickering LK, ed. Red Book: 2009 Report of the Committee on Infectious Diseases. 28th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2009: 484-485.