



PARAGONIMIASIS AND THE LUNGS

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This column has always been dedicated to educating therapists in how to use data the clinical lab provides to better assess patients. Paragonimiasis is a unique clinical situation that can cause a real diagnostic nightmare, even in a teaching hospital.

Paragonimiasis is more commonly seen in areas of the world outside the United States, especially the orient. Principle endemic regions are in Japan, South Korea, Thailand, Taiwan, China and the Philippines. Human infections have also been reported in South and Southeast Asia, Indonesia, islands of the South Pacific, and northern South America. Africa also has a species of *Paragonimus* but the connection to human disease is not fully established. Because of this distribution, Paragonimiasis is not often considered in a differential diagnosis for patients in the United States. However, with air travel giving people the ability to be anywhere in the world within a matter of hours, it is not out of the realm of possibility that a therapist might encounter a patient with paragonimiasis.

Paragonimus eggs can migrate through the diaphragm to the pleural cavity and lungs

The most common species infecting man is *Paragonimus Westermani*. *P. Kellicotti* has also been diagnosed in patients in the US. *Paragonimus Westermani* and other *Paragonimus* species are parasitic organisms that belong to a

group of parasites called flukes (flat worms) of the class Trematoda. They have a thick outer cuticle and one or more external suckers for attaching to a host. These animals have a snail-crustacean life cycle. Other flukes in the Trematoda class include *Schistosoms*, *Fasciolopsis*, and *Clonorchis*.

How would a patient with a *Paragonimus Westermani* or *Kellicotti* infection present? Most patients (92%) develop a non-specific cough, often with hemoptysis, sputum and fever. Some patients (approx 45-50%) have generalized chest pain. Simple chest radiographs will show a ring-shadowed opacity, 5-10 cm, comprising several small contiguous cavities that give the appearance of a bunch of grapes. CT of the chest may show pleural lesions (60%) or parenchymal (92%) lesions. Some will show solitary nodular lesions, mimicking lung cancer, tuberculosis, or fungal diseases. Because of the life cycle of the parasite, some patients will complain of abdominal pain (this is where an initial diagnosis might be made with the adult worm being seen on exploratory laparotomy).

As you can see, these symptoms are generalized and complicate the correct diagnosis. Other information that is very helpful

is a good history, including demographic, past medical and social histories regarding recent travel to endemic areas in the previous year. A dietary history of eating undercooked fresh-water crabs, crayfish, or wild boar are very meaningful.

Because of hemoptysis, a bronchoscopy should be considered because the eggs of *Paragonimus* can be seen in sputum cytology as well as in a bronchial lavage. As stated previously, these parasites have a snail-crustacean life cycle. Both man and animals can carry these worms, which penetrate the gut into the peritoneal cavity, and migrate through the diaphragm to the pleural cavity and lungs. Undeveloped eggs can be passed in the sputum or feces into fresh water. The eggs hatch in water and go through a series of developmental stages in a snail (miracidium, sporocyst, redia I, redia II, cercaria) and enter the gills, muscles or viscera of fresh-water crustaceans. Man comes along and eats the crustaceans (crabs, crayfish) and thus the cycle repeats itself in another mammalian host.

Additional laboratory data that are useful are an elevated WBC count ranging from 6,000-11,000/mm³, with an elevated eosinophil percentage on the differential of 5-45% (significant eosinophilia). Elevated interleukin (IL)-5 levels are often present in the serum and/or body fluids and can be identified in the laboratory by the ELISA technique.

Treatment with Bithionol (40 mg/kg by mouth every other day for 10 doses) or Praziquantel (75 mg/kg/d for 2 or 3 days) is the treatment of choice. Relapses have been reported (Coleman and Barry, 1982) which were successfully treated with a second course of Bithionol of 15 additional doses.

Prognosis for *Paragonimus* sp. infections in the lung is good. Light infections often show spontaneous cure and death of the worm in 5-6 years. However, in heavy pulmonary infections, or with cerebral involvement, the outcome is serious.

In summary, paragonimiasis, albeit uncommon in this country, is certainly a possibility in the difficult-to-diagnose pulmonary patient with chronic cough and hemoptysis. A history of travel to Asia or the Orient, and dietary consumption of fresh-water crabs or crayfish in the presence of a moderately increased white blood cell count and significant eosinophilia would tip the clinician off to ordering sputum cytology and seriously considering bronchoscopy. The definitive diagnosis could then be made with the finding of typical operculated ova (eggs) in the sputum, stool, pleural fluid, or sputum sample by the parasitology and cytology sections of the laboratory.

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